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6 DISTROS COMPARED

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10
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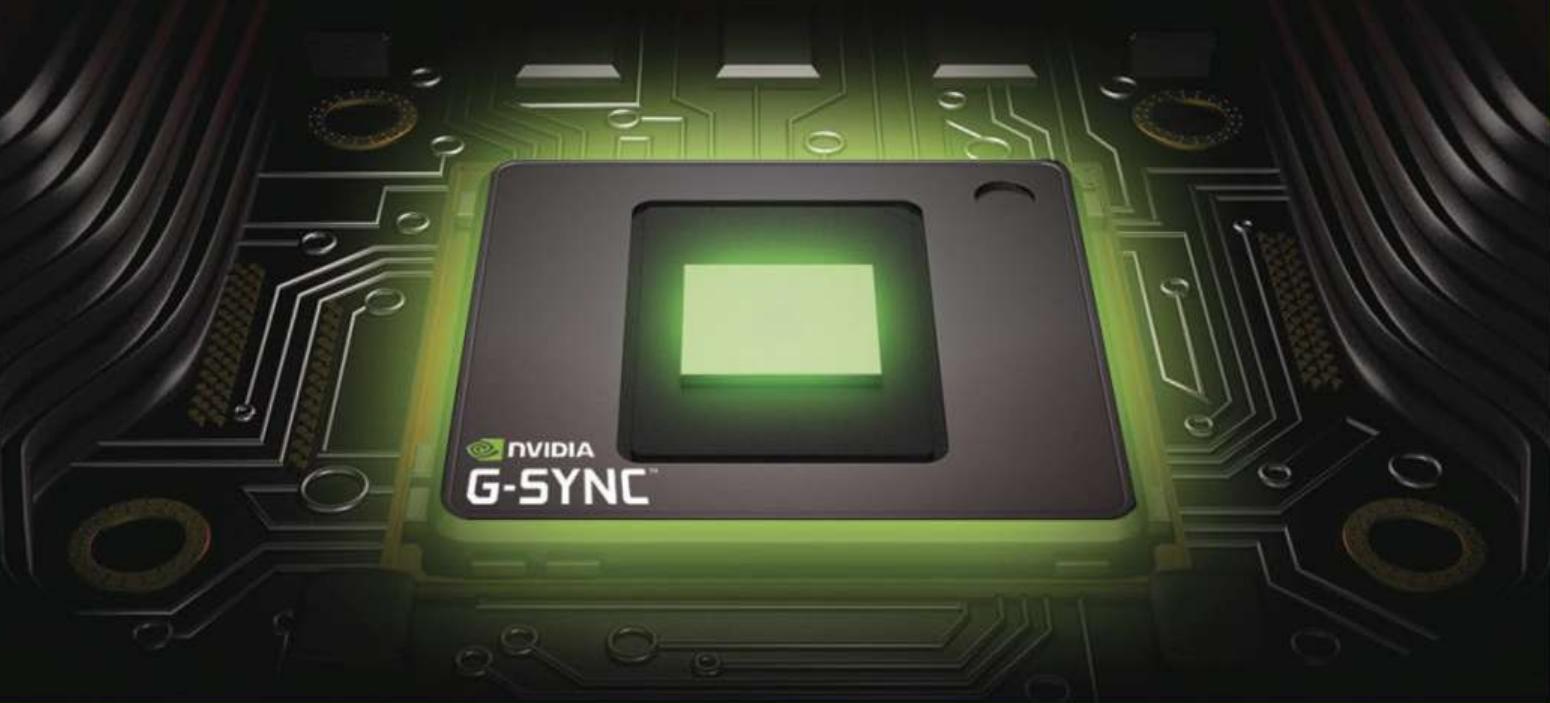
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THE HIDDEN DANGERS AND HOW TO PROTECT YOURSELF



NEXT-GEN SSD UPGRADE GUIDE
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BEST GAMING EXPERIENCE WITH G-SYNC



WHAT IS G-SYNC?

G-Sync is an adaptive sync technology introduced by NVIDIA and supported by ASUS as a tier 1 partner. To understand what G-Sync is, it's important to first understand what an adaptive sync solution is and the hardware within your PC that contributes to making up the parts of the technology, which are required to deliver the solution.

G-Sync aims to synchronise the delivery of rendered frames from the graphics processing unit (GPU) to the system's display. Connecting the GPU and the display is a DisplayPort 1.2 connection. This is vital for G-Sync to work and the technology does not work without it, for example, using a HDMI connection.

In the non-adaptive sync framework – the traditional GPU-display relationship – the GPU renders a dynamic number of frames per second, e.g. fluctuating from 80 to 160 frames per second (fps). However, the display is designed to operate at a static operating frequency, e.g. 144Hz.

For a smooth gaming experience, the ideal solution is to have the number of rendered frames from the GPU match the refresh rate of the display, e.g. 144fps @ 144Hz. Yet this ideal scenario is difficult to achieve given the dynamic nature of frames delivered from the GPU to the display.

Many years ago Vertical Sync – or V-Sync for short – was introduced to lock the maximum frame output of the GPU to the refresh rate of the display. While this fixes the issue of matching the number of frames from the GPU to the refresh rate of the display, it doesn't resolve the effect of visual lag (frame stuttering) and also incurs an input lag due to frame buffering.

Enter G-Sync, the gamer's saviour for smooth gameplay regardless of frame rate!

For a brief video from NVIDIA explaining G-Sync technology in simplified terms, check out this link: <http://bit.ly/1L2bW1>

TWO PIECES TO THE PUZZLE

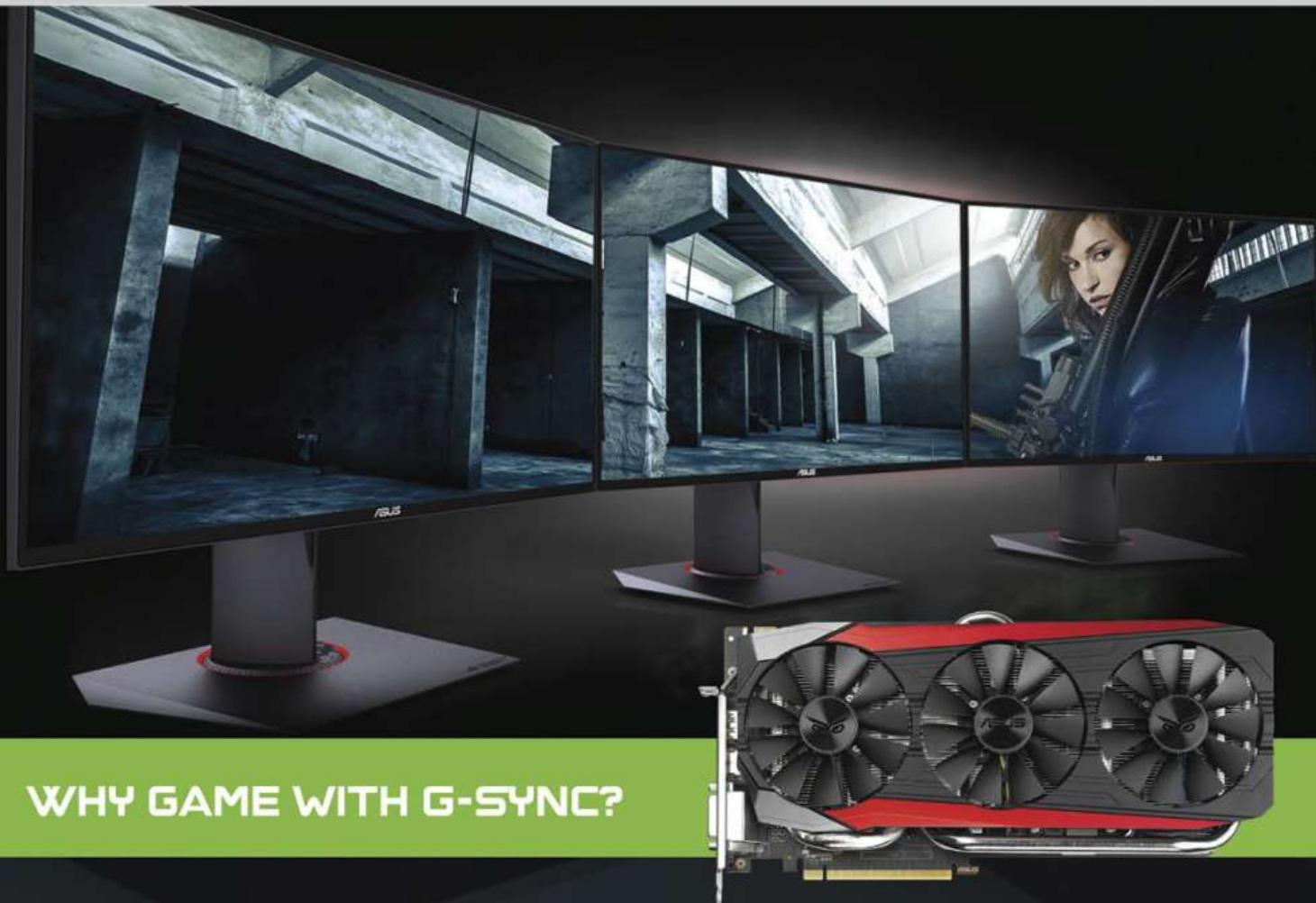
G-Sync requires two pieces to the puzzle: a GPU that supports G-Sync technology and a display with the integrated G-Sync module.

ASUS brought the first G-Sync display to market in the form of the VG248QE. With the technology proven, ASUS upped the game with the PG278Q ROG SWIFT. Flaunting the golden combination of G-Sync, 144Hz refresh rate, 1ms response time, 27" form factor and WQHD/1440p resolution, the PG278Q ROG SWIFT was an instant favourite with gamers the world over and continues to generate fanfare for the amazing gaming experience delivered.

But to enjoy this supreme gaming experience, the display must be paired with a supporting GPU. By pairing with a GTX 900-series graphics card, such as the ASUS Turbo GTX 960, ASUS STRIX GTX 970, ROG Matrix GTX 980 or ROG Poseidon GTX 980 Ti, the puzzle is complete and a superior gaming experience delivered.

To learn more about the
ASUS PG278Q ROG SWIFT,
go here: <http://bit.ly/1Fbq2rH>

For a list of G-Sync supporting
NVIDIA graphics cards,
go here: <http://bit.ly/1Ob8p64>



WHY GAME WITH G-SYNC?

G-Sync provides a solution that resolves the initial problem of an unsynchronised GPU-display relationship and the disadvantages associated with V-Sync. For the gamer, this means there is no frame stuttering, no frame tearing and no input lag induced by G-Sync. For gamers, this delivers an unparalleled gaming experience!

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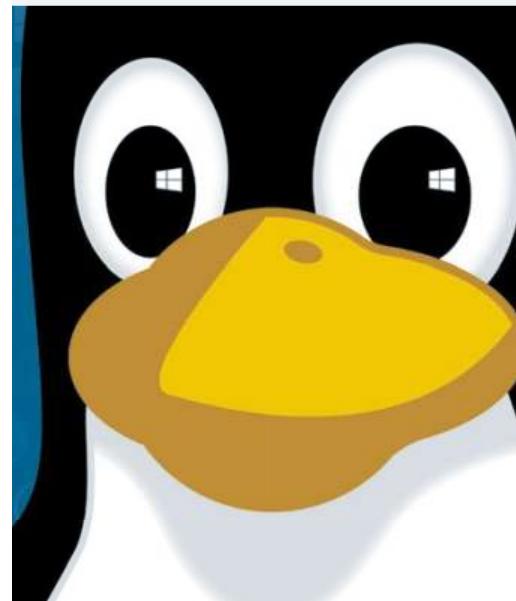


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UPGRADE TIME

Building the best

Like many of you, I'm sure, I've been busying myself planning and building a new PC. Intel's Skylake CPU, or '6th-gen' as it's now officially known was the impetus, along with Windows 10, but it's not strictly the CPU or OS that has me so excited. With Skylake, came the 100-series Intel motherboard chipset, and with that, a big leap forward.

Parts of this project have been smooth and delightful, but, as is the way of the PC, unexpected headaches got in the way of complete satisfaction. Ultimately it was a learning experience, being the whole point of it all.

The CPU is the i7 6700K, and it's sat in a Gigabyte GA-Z170X Gaming G1 motherboard equipped with 16GB of Corsair DDR4 thumping along at 3200MHz. So yes, it's a beast, and its full beastly potential was effortlessly realised. All the Corsair DDR4 needed to hit 3200MHz was enabling the XMP profile in BIOS. It's been faultless, and that just goes to show how mature DDR4 manufacturing is, thanks largely to the experience with X99 product over the last few months. The CPU hits 4.5GHz overclocked via the simplest possible effort – all I did was select a BCLK of 100, upped the voltage to 1.3 and off she goes. I haven't had the time to really play with it, there's a bit of headroom, I feel, and 1.3V is almost certainly unnecessarily high, so right now it's on stock and I'm looking forward to hammering away at that adventure a little later.

It's all sitting in Cooler Master's new MasterCase, I've reviewed that on page 40. I was a little hesitant at first because the motherboard is eATX, and the case only officially supports up to ATX, but the motherboard gods were smiling, and it fits nicely. If you

are considering a similar build, remember that the actual dimensions of an eATX case can vary significantly, but for me the cable holes on the Master Case were far enough away from the motherboard edge to make it all work.

Audio is a pretty big deal to me. I run it all through a nice NAD amp and a pair of Krix Equinox speakers for maximum game and music outrageous uber-fidelity. The GA-Z170X Gaming G1 has outstanding onboard sound via what is almost a full Creative ZxR sound card. I've been running a discrete ZxR for a few months, but the new build was an opportunity to revisit my old friend the Asus Essence STX. I bought that card several years ago and it's still the very best (outside of proper studio recording gear). If you get this same motherboard I promise you won't be disappointed in the onboard ZxRi audio, I don't think there's better onboard audio today.

The only disappointments with this build were the PCIe and SATA lane configurations. I mention this in my review, and Bennett's written a deeper explanation of the new SSD standards on page 30. I'm running a Kingston HyperX M.2 and it's ripping along at 1600MB/s, but it cost me four SATA ports to get it. M.2, along with NVMe is the way it's all heading, though, and this drive is a beast.

It's always a thrill to build a new PC. This one's very nice and I hope I'm not the only one having this much fun!



Ben Mansill

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- Our tests are performed by experienced reviewers in our Labs in accordance with strict benchtesting procedures
- Our brand new benchmarks have been tailor-made to reflect real-world computing needs
- We put tech through its paces – seriously. From processing power to battery life, from usability to screen brightness, our tests are exhaustive
- We will always offer an honest and unbiased opinion for every review

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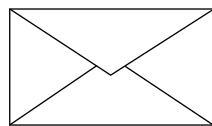
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INBOX

You do say

WIN WOES

One would think that with all the months leading up to the release and with Windows 10 Preview being available, all the companies would be ready. Well they weren't.

I know for certain Logitech had to release an update after the release so their 'LCD' series of keyboards would work. And if you troll through the myriad of different products out there and check their specifications, there aren't a great deal that quote 'Windows 10' ready or have it listed as compatible operating systems.

My next point is with Windows 10 itself. I have seen comments like, 'I am going back to Windows 8.1', or 'I am going back to Windows 7', much like the comments post XP and Vista. I am an amateur overclocker and enjoy my gaming and I have not experienced any real problems as yet.

People need to get with the times or get left behind. The might as well escape to a log cabin in the middle of the wilderness with Wi-Fi.

James Howden

WHAT DRIVERS?

I enjoy reading the PC & Tech Authority newsletters but I have to say that I'm getting very annoyed about all of your Windows 10 stories. In your latest edition, you write about Windows 10 getting to 75 million users but how many of all of those end users have either gone back to Windows 7 or Windows 8 because of all the problems with Windows 10?

How about you write an article on all the bad stuff about Windows 10? I have tried the Windows 10 update 9 times now and all I get from Windows 10 is that it freezes up and crashes and Microsoft and all the driver software

companies don't even seem to care about the end users who are having problems with Windows 10. All Microsoft can say is that they are sorry for the problems that I'm having and with no real solution to fixing the problem.

As it turns out, the problem now is with Intel as they have not even upgraded their display drivers and this appears to be what is causing my problem at least with all the freezing up and then crashing. I have already gone through one hard drive because of all of these problems and I have had it with Microsoft and Windows 10 so I won't be going back until something is done about getting Intel to update the display and other drivers.

Ian Sorensen

Ben Mansill replies: *Switching to a just-released OS, even one with many months of public beta testing, means running a small risk that some of your hardware and devices may not be fully supported the day you make the jump. Always search company sites and especially user forums that discuss your most important devices to see if there are any known issues, and if there are, wait until everything looks solid before upgrading, you have a whole year of it being free, after all.*

WAIT, WHAT?

Hello I am one of your subscription readers. I love your magazines but I am in a bit of a puzzle. I have always dreamed of building a PC but when I asked my parents they said "You don't get warranty, if you get a Mac you can just return it to the Apple Store and they will replace it for you."

I know the Mac is a good option but I can get much more with a PC and this is crucial as I will be running high end software. What can I do?

Tom Barker

Ben Mansill replies: *Hi Tom, your parents are either not being completely honest with you for reasons that aren't clear to me, either, but hey, parents huh? Or, they have a poor understanding of consumer rights. Or maybe they just hate PCs and love Macs. All pre-built PCs, or component parts (if you DIY) have a warranty. Get that PC, Tom!*

ON THE SURFACE OF IT...

I wonder if all those Apple fans who flogged Surface Pro are now going to praise this device as the Holy Grail of portable productivity? I've read a lot of bashing on the Surface Pro for being too expensive, but now this cost more and has less functionality.

I wonder if those people who complained that you had to buy the keyboard separately for the Surface Pro will point out the iPad Pro doesn't include the pen and the keyboard in with the price and also that the cost of these accessories are very high.

Some people bashed Surface Pro 3 for costing a lot and not being a good tablet or a good laptop, but a half baked combination of the two. I wonder what those same people will say about this having a keyboard and entering the Pro domain?

FourEyedGeek

SPACE WARS

We have a NBN satellite earth station a few kilometers away on a back road. The story that is going around is that it doesn't work because the satellite launch was delayed. It seems that our Government's stance toward Russia over MH-17 has resulted in Russian retaliation, and the satellite is hostage to politics. This, I think that can only be blamed again, on our politicians, not the Russians.

David Morton

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Please limit letters to 200 words, where possible. Letters may be edited for style and to a more suitable length.



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TECH NEWS

The latest trends and products in the world of technology

HAS MICROSOFT DOWNGRADED PRIVACY IN WINDOWS 10?

Default privacy settings and new features in Windows 10 have some users worried. Nicole Kobjie asks the experts if there's genuine cause for concern

Is Microsoft trying to snoop on users with Windows 10? That's the accusation being levelled at the company by some customers.

For example, Cortana isn't new, but the voice-enabled smart assistant can now use your microphone to eavesdrop and learn your speech patterns. Then there's the diagnostic tool, which can collect more data from crashes, and may even send snippets of your personal files back to Microsoft. That's not to mention the extension of personalised advertising into apps, with Windows 10 studying your behaviour to decide which ads to display.

Finally, there's WiFi Sense, which lets you share your network with anyone in your contact list, without sharing the login details. While that can protect your privacy, it also automatically offers to share your Wi-Fi with everyone in your contact list – although you do have to approve the connection first.

Has Windows 10 turned Microsoft into the industry's biggest snooper or has it merely brought it in line with rivals who have been hoovering up our data for years? "The industry is changing," said IDC analyst Al Gillen. "The need to access personal information is necessary to be

competitive with products from Google and Apple. Interestingly, nobody seems to complain that Siri can read your personal information and use your location. However, I do agree that Windows 10 is moving forward in ways that are different and likely to make customers unsure."

SLY SETUP?

Rather than the features themselves, it's the setup procedure that has some concerned. Why aren't these features opt-in? "Oddly enough, it's all opt-in, assuming you don't take the easy route during setup and choose 'Express Settings', which, of course, most people do," said Paul Thurrott, of SuperSite for Windows. "The idea that people are complaining about Microsoft enabling features that they've not taken five minutes to understand or opt out of is amusing."

Indeed, Microsoft explains the new features in detail before you choose whether to use the Express Settings, but Gillen argues that finding the right settings to change after installation is "difficult", even for experienced users. Regardless of the setup route, Cortana is opt-in and WiFi Sense is on a connection-by-connection basis: "you have to jump through a few

hoops to even use this feature", according to Thurrott.

However, there is one Windows Update setting he finds "troubling": "By default, the system will download and upload Windows Updates to other PCs over your home network (which is fine) and over the internet (which is not). This isn't about privacy, but is more a secrecy and bandwidth issue. People pay a lot for their internet, or have a slow connection, and this option should be disabled by default or opt-in."

MARKETING FUTURE

Ads in Windows are also becoming more personal, with behavioural data gathered from the Edge browser and the operating system itself influencing ads in apps. Is this a sign that Microsoft is trying to expand its bottom line with data to pay for the "free" software, like Google? "Some people accept this as part of free software in a services-based economy," said Gillen. "Others try to fight the trend. If you're concerned about Cortana, you can use Windows XP forever."

Thurrott disagrees that data harvesting is Microsoft's new business model, as Windows 10 is only free for a limited time.



HOW TO CHANGE YOUR SETTINGS

Did you take the easy route when installing Windows 10 and opt for Express Settings? Here's how to protect your privacy.

WIFI SENSE

You need to give WiFi Sense permission every time you want to share your network connection, but you can turn it off completely by going to Settings | Network & Internet, and clicking "Manage WiFi Settings". Turn off "Connect to networks shared by my contacts". You can also select which contacts to share with.

CORTANA

Microsoft's digital assistant collects behavioural and contextual data from your location, contacts, and calendar, and even

your microphone. To change the settings, type "Cortana" in the Start menu Search bar to bring up Cortana & Search settings.

ADVERTISING

Turn off personalised advertising in apps by heading to Settings | Privacy. Under General, turn off the selection regarding your "advertising ID". You can also tell Microsoft not to analyse your keystrokes or your language preferences here.

DIAGNOSTICS

In the Privacy settings, click Feedback & Diagnostics to change when data is sent, whether Windows will ask permission first, and what's collected. Unless you're running an Enterprise version, you can't opt to send

nothing. Your options are Basic, which sends error reports and essentials such as the version you're running; Enhanced, which includes usage data such as how long you use a feature; and Full, which can include system files, memory snapshots and snippets of your document data.

THE REST

The Privacy section under Settings is worth a few minutes of your time. Here, you can tell Microsoft whether it can track your location; whether apps can see your calendar, microphone, camera or contacts; how syncing works with other devices, from your Xbox to tracking beacons; and which apps can run in the background, and potentially leak data without you realising.

IDF 2015: INTEL LOOKS BEYOND LAPTOPS

Windows PCs barely got a look in at this year's Intel Developer Forum. Nicole Kobie reveals why Intel is focusing on the Internet of Things

From the first convertibles to prototype laptops with a transparent chassis, the Intel Developer Forum (IDF) has traditionally showcased the latest computing innovations – and the processors that go inside them. Yet, even with the release of Windows 10 still fresh in the mind, there was little focus on laptops and PCs at this year's IDF in San Francisco.

Instead, Intel's execs couldn't stop talking about the cloud and the Internet of Things (IoT). "I look at all the opportunities, and one thing is clear: computing is everywhere. It's in our bags, our homes, our cars," said Intel CEO Brian Krzanich during his opening keynote speech at the event.

▼ CEO Brian Krzanich delivers his opening keynote at IDF in San Francisco



Industry watchers claim that Intel's emphasis on IoT shows it's determined not to miss out on the emerging market in the same way it did with smartphones and tablets. "Unlike mobile where Intel was admittedly late to market, it wants to be ahead of the IoT edge market, and this was the focus of this year's IDF," said Patrick Moorhead, an analyst at Moor Insights & Strategy, referring to the hardware that sits at the "edge" of IoT systems and collects data before sending it over the network.

Intel has already enjoyed success in industrial IoT hardware, such as single-board computers for retail signs, but it now needs to "prove itself" with its embedded lines, said Moorhead. These include Intel's Quark, a tiny system-on-a-chip, and Edison, a computer the size of an SD card for developing wearables and maker projects.

IoT represents a massive growth opportunity for Intel, with Gartner predicting that there will be 25 billion connected devices by 2020. "Intel has a much better chance of success in IoT than it did in mobile," said Moorhead. "Unlike in mobility, Intel is ahead of the market, and that will make a huge difference. In a sense, Intel is over-investing in IoT, well ahead of the market and business surge."



▲ Google's Project Tango handsets will use Intel's RealSense 3D camera

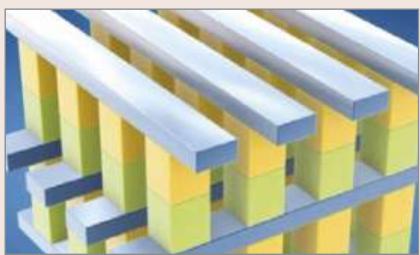
called the company's cloud offering the "800lb gorilla in the server market," and Moorhead agreed. "Intel has a market share of over 95% in cloud server processors, so it is killing it," he said – although he noted that the competition "isn't standing still", with ARM making inroads in the server ecosystem. "It will be hard for Intel to maintain its 95% market share, as it is for any company with that much dominance in a market."

Yet, despite the focus on alternative platforms, Intel hasn't yet given up on PCs and laptops, according to Moorhead. PC processors still make up the bulk of Intel's revenue, accounting for well over half of its US\$13.2 billion turnover last quarter. Although laptops weren't front and centre, further details about the Skylake processor family were announced at IDF, and there were dozens of sessions on graphics, security, user interfaces, power consumption and memory architectures, "all of which are centred around the PC or will bring additional value to the PC," said Hung.

BEST OF IDF 2015

OPTANE

Intel unveiled its first product based on 3D XPoint, a new non-volatile memory technology that promises vastly improved performance at lower cost (see p97). Optane combines 3D XPoint with Intel's memory controller and analytics software, with SSDs bearing the Optane brand set for release sometime in 2016.



CANCER CLOUD

Intel's Collaborative Cancer Cloud is a medical project with the Oregon Health & Science University (OHSU), which uses Big Data and analytics to provide personalised treatment for the disease. The aim is to sequence a patient's DNA in a single day to provide precise treatments for cancer as early as 2020.

REALSENSE AND PROJECT TANGO

Intel's RealSense 3D cameras let users log in to a Windows 10 PC using facial recognition, but the cameras have only appeared in a meagre selection of laptops and tablets so far. Now, Google is using the depth-sensing cameras in its Project Tango handsets, which are the tech giant's take on the smartphone of the future.

WAKE ON VOICE

Windows 10 did get a mention with "Wake on Voice", which lets you say "Cortana, wake up" to your sleeping machine. The feature was first unveiled last year with the launch of the Core M processor, and it now also works with Skylake chips.

ROBOTIC EYES

Intel also showed off RealSense being used as robots' eyes. "Robots have always had eyes, but until now there has never been a cost-effective way of giving them 3D vision," said CEO Brian Krzanich about the Saviore robot, which can navigate its way around a hotel to offer services to guests.



GAMING NEWS

Rob North takes a break from the hardware to enjoy the wonderful world of gaming

UBISOFT GETTING INTO THE THEME PARK BUSINESS

Developer and publisher expands its franchise milking efforts into the real world

Ubisoft has announced plans to open a 'next-generation' theme park based on its popular video game titles in Kuala Lumpur, Malaysia.

The 10,000 square-meter indoor park will feature rides and attractions with characters and features from the company's biggest franchises including Assassin's Creed, Just Dance and the Raymanspin-off Raving Rabbids.

The project is being led by Ubisoft Motion Pictures in collaboration with Malaysian theme-park developer RSG, and is scheduled to open in 2020.

"Together we are creating a place where every guest is a player, every ride is a playground, every visit is a game," said Jean de Rivières, senior vice president, Ubisoft Motion Pictures.

While opening a theme-park might

seem like a strange move for the company, Ubisoft Motion Pictures also launched an award-winning ride based on the Raving Rabbids franchise at France's Futuroscope theme-park in late 2013, and they're not the only videogame maker to dabble in real-world attractions. Sega opened a similar indoor theme park in Dubai in 2009 – in many ways akin to the ambitious and now long-closed Sega World Sydney amusement park meets arcade hybrid – and Nintendo recently announced plans to team up with Universal to build new rides based on its iconic first-party titles and characters.

We can't wait to see what Ubisoft has in store for us, though there's been no word yet on whether we'll need to sign up to UPlay to access the park.

NINTENDO APPOINTS NEW PRESIDENT

Former Nintendo of America CEO to bring Nintendo into new era

Nintendo has promoted long-serving executive Tatsumi Kimishima to the position of company president, following the untimely passing of Satoru Iwata earlier this year.

You're not alone if you haven't heard of Kimishima before – serving as the head of Nintendo of America between 2002 and 2006, Kimishima typically played the silent leader, allowing Reggie Fils-Aimé to assume the role of the public face of the company in the West.

Kimishima will pick up the reigns from acting company leaders Shigeru Miyamoto and Genyo Takeda, who many assumed were frontrunners for the president position, and who have in turn been appointed as Nintendo's "Creative Fellow" and "Technology Fellow" respectively and will play key roles in providing advice and guidance in their areas of expertise.

The announcement comes alongside news of a widespread organisational restructure of Nintendo, with the merging of the Entertainment Analysis & Development team and the Software Planning & Development teams. It also comes as the company moves into new territory with the launch of the mysterious Nintendo NX, and follows a partnership with Japanese company DeNA in a fresh effort to capture the previously ignored mobile game market.



TATSUMI KIMISHIMA

EPIC GAMES RELEASE A TREASURE TROVE OF FREE ASSETS

Take that, Unity!

Unreal Engine developers Epic Games have given amateur and professional indie developers alike a huge reason to use the latest release of their popular game engine by providing thousands of free art and sound assets from the popular mobile game series Infinity Blade.

The majority of the 7,600 assets including props, visual effects, raw sound files and weapons, which are now available across eight packs in the Unreal Engine 4 Marketplace, are drawn from the sadly cancelled 2013 dungeon crawler spinoff Infinity Blade: Dungeons – although there are a few bits and pieces from successfully released games in the series. Epic Games places the total combined value of the assets at around USD\$3 million.

While Epic Games promises there are "no strings attached" when it comes to use, the usual conditions of the UE4 Marketplace apply – you can only use the content in Unreal Engine games, and after the first \$3,000 gross revenue per game per quarter Epic will take a 5% royalty.

HUMBLE STORE INTRODUCES 'CHOOSE YOUR OWN CHARITY'

It's like a charitable choose your own adventure.

When it comes to buying games it's hard to look past the Humble Store, with discounts that often rival major competitors Steam and GOG, and the warm and fuzzy feeling that at least a small portion of the cash you're wasting on another game you'll probably play a few times and forget about is going directly to charity. Until recently that donation has been split over five predetermined charities. Now you can be the one to decide where your money goes.

In a post on the official Humble Bundle blog, Humble Mumble, the company announced that gamers will now be able to choose where their money goes from a selection of over 35,000 charities, and if you can't decide the funds will be sent to a featured charity. You can set your preferred charity from the front page of the store, or select a new charity each time you make a purchase.

SOUND YOU CAN SEE

The innovative and exciting new family of advanced gaming headsets from Corsair.



VOID RGB WIRELESS

- > 2.4GHz wireless freedom up to 40ft
- > Genuine Dolby 7.1 Surround
- > 50mm neodymium drivers
- > InfoMic - LED audio status indicator

VOID RGB USB

- > Genuine Dolby 7.1 Surround
- > 50mm neodymium drivers
- > InfoMic - LED audio status indicator

VOID STEREO

- > 50mm neodymium drivers
- > Universal compatibility with PC, Xbox One, PS4, and mobile
- > Microfiber-wrapped ear pads

InfoMic
Everything you need to know about your audio status — instantly.

RGB Lighting
Sync with other Corsair RGB devices — or light your own path.

Epic Audio
Custom tuned oversized 50mm neodymium drivers and genuine Dolby 7.1 surround deliver innovative sound quality for a truly immersive audio experience.



CHIP NEWS

AMD brings out a big Tongan to resurrect ATI and wave goodbye to its Keller star. Meanwhile Nvidia stay in bed with TSMC and Intel reveal a laptop part that's missing the padlock. **Mark Williams** brings us

CPU

KELLER MOVES ON

When AMD revealed that it was working on a completely new x86 CPU architecture known as Zen, and brought out the big guns in the form of Jim Keller, who had overseen work on AMD's incredibly successful K7 and K8 architectures, the x86-64 specification and the HyperTransport interconnect before moving on to Apple to help with their A4 and A5 series SoCs.

Having brought Keller back in 2012 to "oversee the teams defining the roadmaps for AMD's CPU cores, systems IP, and server and client SoCs", Keller is now moving on "to pursue other opportunities".

AMD stressed that Keller's departure won't have any effect on the company's planned product roadmaps and has in fact put in place a strong team that it says can successfully deliver Zen cores

and associated IP and SoCs in the latter half of 2016.

AMD's CTO Mark Papermaster will step in as acting team lead to help finish up the work on Zen.

INTEL SNEAK IN A MOBILE GEM

After their initial launch of the 91W enthusiast focused 6th generation Skylake processors in the form of the i7-6700K and i5-6600K, Intel recently launched the rest of its product line-up which sit from the 65W TDP power bracket all the way down to the 15W low-power range.

While most of the line-up is pretty standard fair, there is one in particular that deserves a little more attention than the rest.

The i7-6820HK at 45W is an unlocked mobile processor. With four cores

sporting hyper threading running at 2.7GHz base and up to 3.6GHz turbo at stock speeds, this processor might just be the next biggest thing for companies like Asus, MSI and Alienware to stick in their next gaming-focused laptops. Though unlocked, the limit will be on how much cooling said laptops can cram in to support such overclocking.



AMD's CTO Mark Papermaster steps up to lead work on the Zen CPU

GPU

R9 380X

Last year AMD released the R9 285 with the then new GCN 1.2 architecture powered chip codenamed Tonga Pro. The R9 285 is a die-harvested chip, with 256 of its shader cores disabled and a portion of its memory interface also disabled which left the GPU with a 256-bit wide interface.

The full blown version, Tonga XT, with all 2048 shader processors and full 384-bit memory interface were cherry picked and kept solely for Apple products under the moniker of the R9 M295X, and we were left wondering if we'd ever see Tonga XT come to desktops.

Well the wait could soon be over. Pictures and details have leaked of what will purportedly be called the R9 380X. Claimed specs are that of a fully enabled Tonga XT chip which will come with either 3GB or 6GB of GDDR5.

Clock speeds are unknown at this stage but if AMD's 300 series refresh is anything to go by we can expect a slight bump in clocks over the original R9 285.

With units currently in production, expected launch is towards the end of October this year.

PASCAL SET FOR 16NM

The next generation of GPUs coming in 2016 will most likely usher in possibly the biggest boost in performance that we've ever seen in a single generation. The reason? By next year, GPU's would have been using the current 28nm fabrication process for over four years, and next year that's finally all going to change.

It has been confirmed that Nvidia will be using TSMC's 16nm FinFET node to produce its upcoming Pascal-based GPUs. At these transistor sizes expected transistor counts for Pascal are being estimated at around 16-17 million, double that of what's in a GTX Titan X and three fold that of the GTX 980. Big numbers.

There is no word yet on whether AMD will go the down same route with TSMC or use Samsung's new 14nm process for its GPUs.

ATI IN SHEEP'S CLOTHING

After AMD's acquisition of ATI back in 2006, ATI existed as a separate graphics division within AMD for many years until management saw need to merge it more fully into the companies' structure when they started to fall on hard times and



TSMC's 16nm FinFet technology is now mature enough for volume production

began spinning off many assets including Global Foundries to become leaner and remain profitable.

Having come out the other side of said restructuring, AMD have now announced that they are forming a new business unit dedicated solely to graphics and named it the Radeon Technologies Group. This group will be headed by Raja Koduri, a former ATI veteran to oversee AMD's new graphics division which will be responsible for overseeing all aspects of graphics technologies used in AMD's APU, discrete GPU, semi-custom and GPU compute products.

With AMD's discrete graphics market share hovering dangerously around the 20% mark let's hope this renewed focus brings stronger competition to market.

Apacer

Unleash Your Devastating Weaponry

OC MEMORY MODULE

COMMANDO DDR4

BLADE DDR4

SYD

J & W computers
<http://www.jw.com.au/>

MWAVE
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MEL

CPL
<http://www.cplonline.com.au/>

Scorpion
<http://www.scorptec.com.au>

PC CASE GEAR
<https://pccasegear.com>

QLD

Umart
<https://www.umart.com.au>

Gold Coast computer centre
<http://www.goldcoastcomputer.com.au>

PERTH

VTECH
<http://www.vtechindustries.com.au>

Just laptop
<http://www.justlaptops.co.nz>

New Zealand

Mighty Ape
<http://www.mightyape.co.nz>

Playtech
<http://www.playtech.co.nz>

Xpcomputers
<http://www.xpcomputers.co.nz>

MOST WANTED

Rob North's delves into this month's best new tech and gadgets

HP Sprout

When we first heard about the HP Sprout late last year we were more than a little skeptical - I mean, how on earth could an all-in-one desktop possibly hope to uproot Apple as the go-to workstation provider for the notoriously brand loyal creative types of the world? But our pessimistic curiosity quickly grew into intrigue, before blossoming (ok, I promise that'll be my last horticultural pun for now) into full on Most Wanted-worthy love as we pored over the impressive list of features, prompting us to feature the 3D Capture Stage peripheral in Issue 213.

Returning once again as a Most Wanted product, the innovative future-focused HP Sprout is now officially available in Australia, and we can't wait to pick one up.

MOST WANTED: We previously described the HP Sprout as arguably the best end-to-end solution for those looking to get their heads into 3D Printing, and we're sticking by that opinion.

Thanks to the Intel RealSense 3D Camera housed just above the 23 inch HD 1080P touch screen, the HP Sprout can scan 2D or 3D objects in a matter of seconds (with the automated 3D Capture Stage turntable add-on it's even easier), ready and waiting for you to play around with, edit or print. And if you want to get a little more hands-on with your creations you can project, display and edit your images on the 20 point capacitive touch mat. It goes without saying that this bad-boy will be pretty attractive for graphic designers, and a growing range of applications optimised to take advantage of the unique features and inputs available on the Sprout Marketplace broaden that attractiveness to a wider range of potential users.

NOT WANTED: Look, I'll level with you - the HP Sprout is an amazing out-of-the-box product, but if you're still hesitant the price will be a big hurdle. It'll set you back an estimated \$3,999 plus an extra \$599 if you want the 3D Capture Stage, and if you want to have a play around with it in a brick-and-mortar retail store beforehand you'll only find it in 17 Harvey Norman stores nationally.



Tt eSPORTS CONTOUR

If you think that mobile games suck you're probably doing one of two things wrong - you're either playing the wrong mobile games, or you're yourself get hung up over the cumbersome on-screen touch controls. If your problem is the latter, there are plenty of game pads that can make the experience much more enjoyable, and the Contour for iOS devices might just be amongst the best.

MOST WANTED: Thermaltake haven't tried to reinvent the wheel with their gamepad design, having borrowed the shape and button layout of the much-loved Microsoft Xbox controller. The MFi certified accessory also features an adjustable clip in the centre that'll hold your iPhone securely in place (the controller is also compatible with iPads but there's unfortunately no way to attach the device as there is with an iPhone).

NOT WANTED: Contour is exclusively for iOS, with no love for Android devices, and the controller itself is a little too flat on either side for my liking and comfort.

Polaroid Snap

The Polaroid Snap is the latest attempt to tickle our nostalgia bones for the pre-digital days, capable of printing out small photos straight after shooting without the use of ink.

MOST WANTED: Baring the look and classic rainbow-stripe of the iconic brand, this pint-sized point-and-shoot uses Zink zero-ink printing technology – each strip of paper is embedded with dye crystals that are stimulated with heat to produce a full colour print. There's also a micro SDHC card slot on the side so you can backup digital versions of your happy-snaps if you so choose.

NOT WANTED: The Snap lacks a display screen, so just like in the old days there's every risk that you'll miss the perfect shot. Plus, if you're after a bit more versatility you're probably better off picking up a Lizard Zip Instant Printer – it'll let you print the same style zero ink photos from any smartphone.



Logitech X50 Wireless Speaker

While it might look more like a high-tech hockey puck than a speaker, Logitech's X50 Bluetooth Wireless Speaker is a great portable solution for those who still value quality audio but don't want to fork over the cash for a UE Boom or Jawbone Jambox.

MOST WANTED: Essentially an updated version of the Logitech X100, the new model is a stylish, colourful and easy to use speaker that you can connect to via Bluetooth or an audio jack.

NOT WANTED: Look, it would have been nice to see some big and noteworthy improvements over its predecessor – which, just quietly, can be picked up at a bargain price at a well-known national office supply store chain - be it a bit of water resistance, or improved battery life (both models will last around five hours between charges).



Thermaltake Riing 12 LED RGB 256 Colors

Following the trend of slapping RGB LEDs on any and all components, Thermaltake has released a brand new 256 colours edition of their Riing 12 LED Series 120mm radiator fan, with an absolute pearler of a tagline to match: "Need Bling? Get Riing!"

MOST WANTED: While you'll be marveling at the fan's pretty lights, with hydraulic bearing and anti-vibration rubber pads you certainly won't be hearing it whir all that much. Thermaltake's own data sheet records a max noise level of 26.4 dBA stock – certainly not the quietest on the market, but pretty damn good.

NOT WANTED: It might be asking too much, but it sounds like there's no way to directly choose your colour gradient – instead you'll need to switch on the multicolor mode and have it cycle through until it hits your preferred look and then hit pause.



SteadXP

Recording camera movement and compensating for any unwanted shakes in post-production, SteadXP is a tiny stabilisation device designed to make your videos look smooth, sleek and less like they were shot by a kid who just knocked back one too many energy drinks.

MOST WANTED: Stead XP attaches to the back of your GoPro or the top of your DLSR, bringing three-axis video stabilisation to pretty much any camera without the need of a clunky mount or gimbal, allowing you to keep moving and shooting uninhibited.

NOT WANTED: Unfortunately since all the stabilisation is done in post-production, you won't know if what you've shot will steady-up enough to meet your standards until after you've headed to the computer. Plus, many of the big players are moving to include five-axis stabilisation to their cameras natively.

PLAYING IT SAFE WHEN CHASING BARGAINS

Anthony Caruana is a smart shopper

We all love a bargain. And one of the best ways to save a few bucks is to buy used equipment. However, that can come with some risks. Depending on what you're buying and where it comes from it's possible that the saving made in buying a used item are lost with a defective product or one that doesn't meet your expectations.

What can we do to reduce the risk of getting stuck with a lemon or dealing with a dodgy vendor?

1. LOOK AT PRODUCT RELEASE CYCLES

If you're particularly loyal to a specific brand, it's worth researching their product release cycles. In many cases, the period immediately before and after a new product release can be a great time to pick up a bargain.

About to be or recently superseded models are often heavily discounted or bundled with some useful extras.

For example, a couple of years ago, we picked up a discounted Lenovo desktop. For an extra dollar we scored a 500GB external drive. And just one more gold coin doubled the RAM.

Lenovo's online store has an outlet section where recently superseded gear is sold at heavy discounts.

2. FACTORY SECONDS AND REFURBISHED PRODUCTS

Apple has a refurbished products section – the link is hard to see as it's in fine print and they move it around from time to time – but recently superseded and factory returned items are often listed for sale at discounts of between 20% and 35%. With new models jumping in price because of our falling dollar, these can be significant cost savings.

With manufacturers such as Dell,



Anthony Caruana

has worked for almost every major masthead in the Australian IT press. As an experienced IT professional – having worked as the lead IT executive in several businesses, he brings a unique insight to his reporting of IT for both businesses and consumers.

Lenovo, Apple and HP, buying discounted or refurbished products directly means warranty support that's backed by large companies that aren't likely to disappear.

3. EBAY

When Pierre Omidyar founded eBay in 1995 to sell a broken laser pointer it's a fair bet he didn't expect it to become a massive global marketplace.

Buying technology over eBay requires research. You need to do your homework on the product you're buying and thoroughly check the vendor's record out.

Buyers and sellers can leave feedback on eBay after each transaction. Take a look at the feedback. While a 99.5% positive rating might look good, review the negative feedback. If there are just isolated instances of late delivery or poor communication, then perhaps there's not much to worry about. But if there's a pattern emerging then perhaps you should look elsewhere.

When it comes to what you're buying don't get caught up in the excitement of bidding. Set a budget and stick to it. Sniping services such as Gixen let you set your maximum bid and automatically bid on your behalf so you avoid the temptation to increase your bid.



4. PAYMENT METHODS

How you pay for your goods using credit cards, PayPal and other payment services is an important consideration.

If you buy using PayPal on eBay there's a dispute process that offers buyers protection against vendors that fail to ship items or items that arrive in poor condition. You'll need to launch the dispute within 45 days of sending your payment and there are escalation procedures should you and the vendor not come to a resolution.

Many credit card companies also offer protection, assuming you buy from a second hand dealer that accepts credit cards. Take a look at the terms and conditions of your card to see what you can do in the event of a possible dispute with a seller.

One other thing – we recommend using a credit card rather than a debit card. Although banks are typically very responsive when an account is hijacked and finds are lost, your peace of mind can be seriously impacted if it's your money that's stolen and not bank's cash.

5. WARRANTIES

Licensed second hand dealers often include some form of warranty when you purchase from them. In addition, the presence of a bricks and mortar store can be useful if you need to go back to them.

We've purchased several computers from reputable second-hand dealers over the years.

Typically, they offer a three-month warranty with an option to extend that to a year for a small fee.

But, like any warranty, make sure you understand what is and isn't covered and what the process is for claims.

NEED HELP? EVER HAD AN ISSUE AS A CONSUMER? INVESTIGATOR CAN HELP.

If you've had an issue or had something happen and you think investigator could help, email your problem to investigator@pcandtechauthority.com.au



VOLANS HM04
Aluminium Premium 4-Port Clamp
USB3.0 Hub



VOLANS DC04
Aluminium 4-Port USB Smart Charger



VOLANS HB10
Aluminium Ultra-Thin 10-Port USB3.0 Hub



VOLANS HJ45
Aluminium 3-Port USB3.0 Hub + RJ45
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www.volans.com.au

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Capitol Computer (NSW)
www.capitolcomputer.com.au
CentreCom (VIC)
www.centrecom.com.au
Computer Alliance (QLD)
www.computeralliance.com.au
IJK (NSW)
www.ijk.com.au
ITSDIRECT (QLD)
www.itsdirect.com.au
JW Computers (NSW)
www.jw.com.au

MegaBuy (QLD)
www.megabuy.com.au
MSY (VIC, NSW, QLD, SA, WA, ACT, TAS)
www.msy.com.au
Mwave (NSW)
www.mwave.com.au
Umart Online (QLD, NSW, VIC)
www.umart.com.au
Wireless 1 (NSW)
www.wireless1.com.au
Winner Computers (NSW)
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SWITCH TO LINUX

NOT BLOWN AWAY BY WINDOWS 10? THERE ARE PLENTY OF DECENT LINUX ALTERNATIVES – AND WE'RE NOT TALKING ABOUT THE UBIQUITOUS UBUNTU EITHER

In this guide for those considering a fresh start with Linux, we've picked six of the best distros, each tailored to suit a different type of user or purpose. Then we've selected five applications that will justify your decision to make the switch. Finally, we'll help you take your first steps in a Linux environment, with the lowdown on how the operating system functions and how it differs from what you're used to in the Windows world.



SIX OF THE BEST

NOT SURE WHICH FLAVOUR OF LINUX TO PLUMP FOR? RUPERT GOODWINS HELPS YOU DECIDE



BEST FOR NEWCOMERS Elementary OS Freya

 Linux has always had the horsepower, but not the looks. That's hurt it in the mass market, but then who's got the time to tune the UI for ordinary people? Elementary OS, that's who. Taking Ubuntu, it has imposed its own design and app selection, and made it clean and easy to learn.

The front-end, Pantheon, liberally borrows ideas from various sources - OS X's Dock is the most obvious - but melds them to create an experience of its own. It's very calm and restrained, rejecting the "more is better" aesthetic that's turned so much of desktop computing into a gaudy jungle. This minimalist approach carries through to the apps with a fundamentalist fervour. The only editor in the system is the aptly named Scratch, which makes Windows Notepad seem overly fussy. You can edit plain text in one size, one font, one style.

Consistency, usability and simplicity are key, but that does mean losing much of the flexibility that many Linux users find addictive. It also comes at the cost of the standard apps - LibreOffice, Firefox, Rhythmbox - that many existing users are familiar with. The browser is Midori, which is a perfectly good second-tier browser but lacks the sort of support the big guns get. Good luck getting it to work with Google Docs, for example. It's Ubuntu underneath, so you can put back all the apps you miss, but then you start to lose the Elementary magic.

It's not a distro for the power user. It certainly doesn't claim to be, and its simplicity will be too limiting for many, but put the rawest of newbies in front of it and watch them discover what computing feels like when it actually likes humans. It's also a work in progress - Freya is version 0.3 of Elementary, and it's not without its hiccups. But if it can encourage more apps to cleave to its design guidelines and grow in functionality fast enough to maintain its current interest, it has the potential to become a major player.

BEST FOR OLD HANDS Mint 17.1

 The price users pay for native Ubuntu is having to cope with its capriciousness. In its search for the magic potion that will make the one Linux to rule all desktops - or tablets, or e-commerce, or whatever it is this year - Canonical has a habit of throwing out things people like and adopting ideas that make more sense for its corporate vision of the day than for those who use it.

Mint has become a popular alternative because it maintains a strong user focus. With the latest versions, for example, it has decided to stop following Ubuntu's six-monthly update cycle and stick with the Long Term Support calendar instead. Thus, Mint 17.1 will be supported until Ubuntu 14.04 runs out in 2019, and no new Mints will change their core Ubuntu system until 2016.

This might seem restrictive if it weren't for the fact that Mint is a stable, functional and mature system, and continues to receive updates that address actual user needs. The Update Manager rates updates by importance, so you can find your own balance between newness and familiarity, and it groups updates, which makes it easier to choose appropriate bundles. It's not a huge change, but it's welcome.

Mint has two desktop environments, Cinnamon and Mate. Cinnamon is the more popular of the two. It's unfussy, familiar and (being Mint-flavoured) repays all that time you've invested in learning how to use the classic mouse-driven model. Imagine Windows 8 had never happened, and that Microsoft had chosen to build on what it had started with XP and spiffed up in Windows 7. That, in effect, is what's happened with Cinnamon. It's a modern classic.

It doesn't pretend to be Windows, though. It's suffused with the spirit of Linux and runs well from the off, with vast configurability built on a stable base. Anyone who's worked with computers for a while knows the importance of being able to build new ways of working without having to replace old methods. If you want an environment that respects that, doesn't obstruct your work and offers variety, join the cohort of experienced Linux users who've found Mint to their taste.



LINUX DISTROS



BEST FOR PROFESSIONALS Fedora 22

 Fedora has a firm fanbase among people who work with Linux for a living, for a number of reasons technical, historical and cultural. The technical appeal comes from Fedora's background: it was developed by Red Hat and IBM alongside Red Hat Enterprise Linux and CentOS, two core distributions that run servers and other services for businesses. As a result, Fedora tends to receive updates ahead of its more buttoned-down brethren, which is great if you like getting early exposure to new software and don't mind being part of the debugging process. Plus, experience in Fedora transfers to the other environments. Certainly, if your business uses any of the Red Hat systems and you have any technical contact with them, Fedora is a good personal Linux to adopt.

This seeps over to the cultural benefits. All popular Linuxes have lively online communities, but Fedora's has a reputation for being friendly and professional. It's a given in modern computing that the primary support resource is Google search: the first tier is the online documentation and user reports, and the second is the community. Fedora's is unmatched, and the documentation is pretty good too.

As for historical: Fedora's primary desktop environment is Gnome, which has developed fitfully and with a few controversial decisions along the way. Fedora is as close as Gnome gets to a home platform, with updates appearing swiftly. Gnome's long history has resulted in a seriously powerful set of utilities and configuration options. There's little that can't be fixed, optimised or personalised using Gnome skills.

This all makes Fedora a good fit for serious-minded Linux users, especially those who develop software. One example is DevAssistant, a tool that takes care of a lot of the housekeeping involved in setting up a new project in various languages. It's open-source so you can use it how you like, but it's baked into Fedora, from where it sprang.

Fedora also comes in a wide variety of packages aimed at specific areas such as security, scientific computing and design. If you wear any of those hats, then Fedora may fit well.

BEST FOR MAVERICKS Mageia

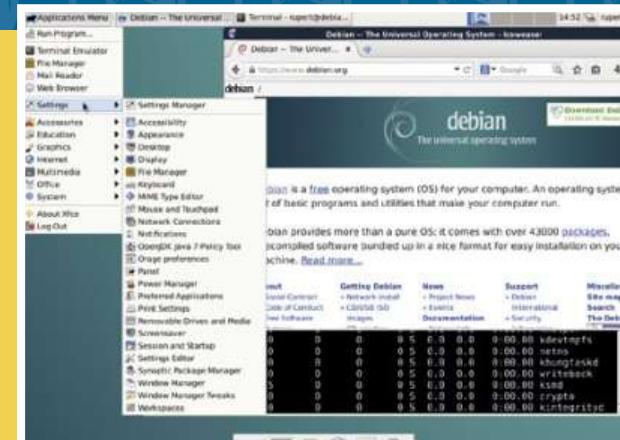
 Sometimes it's just fun to get stuck into something different. Although Mageia has become fashionable recently, its lineage goes back to Mandrake Linux, a French fork of Red Hat Linux 5 started in 1998. After a spell as Mandriva (following a legal challenge by the trademark owners of cartoon character Mandrake the Magician) and a business collapse in 2010, a few ex-employees and other supporters turned the source code into Mageia and carried on.

Being French and having a colourful history is no guarantee of technical excellence. Fortunately, Mageia is built on a mix of usability, independent thinking and community input to produce a distro that's quirky, fun and effective. Typical of this approach is its solution to one of Linux's perennial war zones: should you use software that isn't open, or that may have legal problems, such as an open implementation of a patented or unlicensable codec? With a shrug, Mageia leaves it up to you by dividing its repositories into Core, Nonfree and Tainted. The Core stuff is impeccable, Nonfree is proprietary, and Tainted is the stuff that's open to debate. Mageia was an early adopter of the mix-and-match approach to window managers and desktop environments. You have numerous choices during installation – Cinnamon, Gnome, IceWM, KDE, Mate, LXDE, Openbox, Razor-qt, WMaker, Xfce – although the Mandrake/Mandriva ancestry ensures a strong contingent of KDE supporters.

Mageia is a community effort – it's not based on Ubuntu, Fedora or Debian – and the community spirit is very visible. The greeter app offers links to forums, support centres, chatrooms and documentation, as well as shortcuts to installing popular software without having to go into the installer. The result should be a system that's configured how you like it without you having to learn the details of the system beforehand. The same user focus applies to the system control panel, which puts everything you might need in one place.

Mageia doesn't have one killer aspect, but it's the distro that gets you closest to its community and the way open-source software actually works.





BEST FOR SMALL-SERVER ADMINS Debian 8

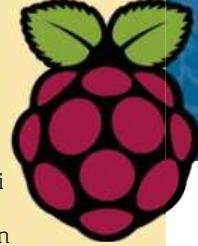
 Debian is one of the grandfathers of modern Linux. Starting in 1993, and with its first full release in 1996, it aims to be the universal operating system and indeed is at the heart of many other distros. Even Debian's full name – Debian GNU/Linux – should give you a flavour of just how old-school the project is. Without going into the politics of whether or not all Linux is really GNU/Linux, adoption of the name is a shibboleth for staunch conservatism, of taking the founding principles of free and open-source software seriously and of not following fad or fashion. Debian was the originator of a long-standing and uncompromising set of documents, the Social Contract and the Free Software Guidelines, which have been influential in setting the standards by which the free-software community defines itself.

That self-image is backed by the Debian experience. Although it's possible to choose from a huge range of desktop and management interfaces during installation, the canonical Debian is austere and highly focused on delivering stability and continuity. Debian is certainly not an organisation to compromise on its principles, either – its browser, Iceweasel, is a fork of Firefox that came about in part because the copyright on the Firefox logo was incompatible with the Debian licensing philosophy. Likewise, the installation process asks a lot more questions than many, because Debian wants you to make choices yourself, rather than hiding important decisions.

Because it updates relatively slowly, with major updates every couple of years or so, Debian retains a lot of old favourites such as the Synaptic package manager. It also comes with the usual set of office and media software. It's by no means only for the traditionally minded hacker, but is a particularly good fit for anyone who thinks that Ubuntu – which is itself Debian-based, of course – used to be better before they improved it.

Debian used to have a reputation for being very stable, but a little crabby and difficult to learn. The past couple of iterations have smoothed out the latter without hurting the former. It's the sort of distro that is particularly suitable for those who want to build a home or small-business server – something you want to just work and not need tampering with and fine-tuning forever afterwards. It also works well across a very large range of hardware, which makes it a good choice if you want to repurpose an old laptop by turning it into a network appliance or media storage hub, for example.

BEST FOR RASPBERRY PI OWNERS Raspbian



If you fancy reliving the thrills and frustrations of the early days of home computing, get stuck into the Raspberry Pi universe. The insanely popular and dirt-cheap single-board computer has attracted the attention of thousands of developers and supports over 20 operating systems, many of which are cut-down or specially configured Linux variants.

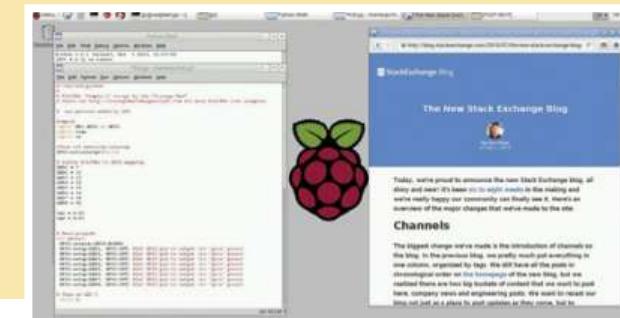
Sadly, not all of these run on the newer Raspberry Pi 2, which has a different ARM architecture to the original. This is a shame, as the Pi 2 has double the core count and twice the RAM of the original, and actually feels like a sensible platform for a full Linux OS. While there is now an Ubuntu derivative (Ubuntu Mate) and even a cut-down, GUI-free version of Windows 10, the standout Raspberry Pi OS is Raspbian. It's the "official" OS of the Pi and has seen by far the most development effort and community response in providing the Pi's unique hardware features with software support. It's supported by the Raspberry Pi Foundation, too, which gives it a huge advantage.

Based on Debian 7, Raspbian offers plenty of specialised configuration and management tools for setting up standard services, manipulating the hardware (including support for the Raspberry Pi camera option and Python libraries for the GPIO interface pins) and a customised LXDE desktop manager that provides an appropriately simplified way of getting at apps. There's a large base of utilities, productivity and just plain fun software to choose from. (Whole villages have disappeared into Minecraft, never to be seen again.)

As standard, Raspbian takes up around a quarter of the Pi 2's gigabyte of RAM, but if you're not bothered about LXDE and graphical support – for example, if you're running the Pi 2 as a headless file server or hardware development system – you can easily get that down to well under 100MB.

Although the profusion of OSes for the Pi makes it easy to dissent – and the development effort to produce more is still growing – Raspbian's status as a robust, simple and fully integrated version of Linux for the device is secure. It does what any good OS should do, which is to provide all the options and support you need to satisfy your inventive urges without introducing its own dramas and delays.

It arrives as part of the cutely named NOOBS installer, which you can download from the Raspberry Pi Foundation's website, and which even a Family Fortunes contestant could work out how to install. You'll need an SD card with at least 8GB of free space to run Raspbian on the Pi, although you may want a larger-capacity card to provide some extra room for storage.



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FIRST STEPS WITH LINUX

DARIEN GRAHAM-SMITH EXPLAINS THE THINGS TO WATCH FOR WHEN YOU FIRST MAKE THE SWITCH FROM WINDOWS

Switching to Linux is easier than it used to be: you can set it up and get working just as easily as you can with Windows. Inevitably, though, there's a learning curve, as Linux has its own ways of doing things. Here's what you need to know when taking your first steps with your new Operating System.

ACCOUNTS AND PERMISSIONS

When you want to change system settings or install software in Windows, a User Account Control (UAC) requester pops up and asks for authorisation. Most Linux desktops work in a similar way, although you'll probably be asked to enter your password rather than click a button.

It's useful to understand why these requesters appear. The user account you create when you install the OS can't change system settings at all. This is one reason why Linux systems have historically been considered very secure and stable. You can't screw up your whole system even if you try, and programs launched from your account can't either.

If you want to make system-wide changes, such as changing your startup options, you have to do it through a special “superuser” account called “root”. Logging in as root is considered very dangerous, precisely because it gives you, and the programs you run, unfettered control over the system. Some distributions (including those based on Ubuntu) disable the root account so you can’t log in as root even if you want to.

Instead, Linux gives you the ability to launch a specific process with root privileges, while everything else retains the restrictions of your regular account. When a requester pops up asking for your password, it's seeking permission to elevate a particular task. If you're using the terminal (see opposite) and want to execute a command with root access, the command is sudo, short for "superuser do".

FILE ATTRIBUTES

Linux's user model isn't just about disallowing potentially dangerous commands. Every file on a Linux system has a set of attributes detailing (among other things) its owner, and who's allowed to access it. If you seem unable to open a file - or you can read but not write to it - this suggests that your account lacks the necessary permissions. Root, of course, can read and write everything, so the answer is normally sudo.

If you want to change the attributes on a file, you can do so from within the graphical file manager, or from the terminal using the chmod command. You can change a file's owner, or set read, write and execute permissions separately for its owner, for everybody, or for all users in a specific group. The ability to divide users into groups is useful for administering large multi-user systems, but on a personal computer you don't need to worry about it.

THE DIRECTORY STRUCTURE

Windows arranges things on your hard disk in a superficially logical way: user folders are stored in C:\Users, programs live in C:\Program Files, Windows system files live in C:\Windows, and so on.

Things are similar in Linux, but not the same. If your username is Ben, you'll find your user folder at /home/ben. You'll notice that the slashes are

- ✓ Like Windows Explorer, Linux groups your files in a convenient series of folders



the other way round in Linux, and there's no drive letter: the root folder, which is referred to with a simple slash, is actually a virtual location, which you can think of as equivalent to "This PC" in Windows.

Usernames are conventionally stated in lower-case. Linux is case-sensitive, so if you go looking for a folder called /home/Ben you won't find it. You'll probably use the graphical file manager most of the time, so this shouldn't be a problem, but it

“THE USER ACCOUNT YOU CREATE WHEN YOU INSTALL THE OS CAN’T CHANGE SYSTEM SETTINGS AT ALL”

can catch you out. It's worth mentioning that “~” in Linux is a standard alias for your home directory - so if you're at the terminal, instead of typing cd /home/ben you could simply type cd ~.

Feel free to click around to see how the rest of the file system is arranged. You can't cause any serious damage as long as you don't do anything that requires root authorisation. Aside from /home, the locations you'll probably hear about most often are

- /bin, where system software lives,
- /usr/bin for user applications, /etc, which stores configuration files, and
- /dev, which contains pointers to physical devices such as USB flash drives. But don't sweat it: again, if you stick to the desktop, you'll never need to worry about these locations.

INSTALLING NEW SOFTWARE

Think Windows 10 is fancy with its app store? Linux has had its own equivalent for decades. Most distros include a graphical package manager, which you use to find

> The terminal is an incredibly powerful tool, but using it isn't obligatory

```
darien@darien-Mint ~ $ ls -a
.
.. .config .gconf .linuxmint Public
.bash_history Desktop .gksu.lock .local Templates
.bash_logout .dmrc .gnome2 .mozilla .themes
.cache Documents .gnome2_private Music Videos
.cinnamon Downloads .ICEauthority Pictures .Xauthority
.dircache .profile .icons .profile .xsessions-errors
darien@darien-Mint ~ $
```



< Package managers make it easy to find and install new software

Unlike in Windows, there's no specific file attribute in Linux that marks a file as hidden. Rather, hidden files are identified by a dot at the start of their filename - so, for example, in your home folder there's a hidden file called .profile that stores information such as the default paths to search when you type a command into the terminal. If you want to view these files there's usually an option to do so in your distro's file manager.

THE TERMINAL

Some people think you need to master Linux's command-line interface, the terminal, to use the OS effectively. In fact, you can be happy and productive without ever opening it. All the same, Linux wizards tend to make extensive use of it because it's so powerful and efficient: with a few commands you can do almost everything from here, including installing programs and carrying out administration tasks.

Of course, learning the ropes takes time. Some of the basic commands are different on Linux and Windows: the dir command works in most distros, but it's an alias for the real command, which is ls. You can use cd to move around directories, but to copy a file the command is cp; to move or rename a file it's mv. To view the contents of a file, use the cat command. You can get more details on how to use these tools with the man command - so, for example, you'd type man cat to find out more about cat.

You can create scripts just as in Windows, and a program or script can be launched by simply typing its name. But remember that a file needs the right attributes set in order to be executable: use chmod a+x plus the name of a file to add the "executable" permission for all users. And your search path takes precedence over your current directory, so rather than typing myscript you may need to specify ./myscript - otherwise a different script with the same name might be executed instead.

Don't forget that, like everything else in Linux, terminal commands are case-sensitive. Entering ls -l will show you the contents of a directory, along with the permissions, owner and creation date. But ls -L will merely return an error.

and install all sorts of software. Ubuntu's is called Software Center, but there are plenty of others to choose from, including Aptitude, Synaptic and Gdebi - and they can all be installed from within your default package manager.

To an extent, which you choose is academic as they all offer the same software. Your package manager will come set up to talk to the biggest repositories of popular free software, such as Firefox and Skype. If you want a program that isn't offered, you can configure your package manager to search additional repositories. You can optionally include "unstable" software that's under development or unfinished, and you may have the option to include non-free software that comes under more restrictive licences.

Compared with Windows, Linux software skews very much towards free, open-source offerings. You might miss familiar tools such as Microsoft Office or Adobe Photoshop, but these days their free equivalents are remarkably powerful - and, as we note on p40, there are some great apps that you might not have heard of.

Also, unlike Windows applications, Linux apps can't tamper with your system settings or startup options. There's no Registry in Linux, so you don't have to worry about clogging up your system with badly behaved applications. And uninstalling a program is as easy as heading back into the package manager and clicking Remove - or your distro's equivalent.

FILE TYPES

When you double-click on a file in Windows, the operating system determines the type of file by looking at its extension - so document.doc opens in Word but document.xls opens in Excel. In Linux there are no extensions - content information is embedded directly into every file.

This identifier is commonly called a MIME type ("Multipurpose Internet Mail Extension"), although these days the proper term is more commonly used is "internet media type". It allows any application to look at a file and know immediately whether it's an application, image, text file or what have you.

This means you can't tell what a file is from its filename - but you can look at its icon within the file manager to see what the system thinks it is. What if you want to open a file with something other than the default? Like in Windows, most file managers let you right-click and select Open With to choose a different default application for that file type. Or, you can open a file with a particular program just once - helpful if, for example, you want to import a text file into LibreOffice Calc.

HIDDEN FILES

In Windows, system files are hidden from view by default. Linux also hides certain files, but usually preference or configuration files rather than anything critical - they're hidden to avoid clutter rather than to discourage meddling.

FIVE APPS THAT WILL MAKE YOU WANT TO SWITCH TO LINUX

IAN BETTERIDGE PICKS HIS FAVOURITE LINUX APPLICATIONS

When people switch to Linux, they usually do so for ideological reasons. However, there are some exceptional cases where Linux software outstrips its equivalents for Windows and OS X. Here are our five favourites. Not all of them are Linux exclusives, but they originated on the platform and are often better maintained on it.

FOCUSWRITER

gottcode.org/focuswriter

We journalists are partial to writing tools. Focuswriter is one of the very best - and it originated on Linux.

For those who aren't familiar with the idea, distraction-free writing programs are intended to be the polar opposite of Microsoft Word or LibreOffice. Instead of offering toolbars cluttered with options, they limit you to plain text and keep formatting options to a minimum so that you spend more time worrying about the writing than whether Bell MT is better than Calibri.

Focuswriter hides everything except the text, although it has a few useful options, such as the ability to set timers (to ensure you take breaks) and a Daily Progress view, which gives you a breakdown of how many words you've written each day, formatted nicely on a calendar. You can also set a daily goal (in minutes or words), and customise the theme to your taste.

It's a great little application, and probably the best focused writing app you'll find for free.

BLUEFISH

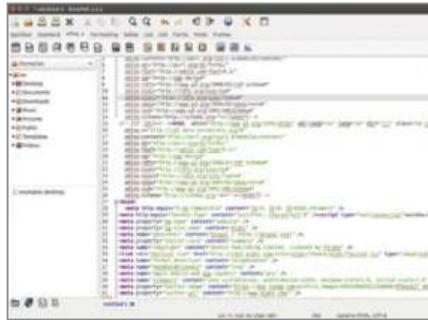
bluefish.openoffice.nl

If Focuswriter is manna for writers, Bluefish is its equivalent for coders. It manages to be both stupendously powerful and lightweight, and although it has been ported everywhere, Linux is its home and tends to receive new features first.

So what's so great about it? First, it's comprehensive: if it's a programming or scripting language, Bluefish will have definition files that format it beautifully for you. It also has in-line reference information for functions, which saves you time when you're struggling to untangle someone else's code (or even your own). You can even integrate external programs to set up incredibly powerful text-processing tools of your own.

Of course, it has support for advanced

search and replace using regex, and you can edit remote files via a wealth of protocols. But it's the small touches that make Bluefish a joy to use, such as a spell checker that ignores code and checks only the prose content.



AMAROK

amarok.kde.org

Commercial media players are either too buggy or too confusing for anyone to want to use them regularly. Amarok is like stepping back in time to the days when music players just worked - even though it has more features than proprietary rivals such as Windows Media Player and the loathsome iTunes.

Amarok integrates with a host of web services, so everything you play can be scrobbled to Last.fm, for example, or you can use Echo Nest for recommendations based on what you're playing. There's also a well-tended podcast directory.

Amarok offers dynamic playlists based on simple queries ("all rock tracks from 1969", for example). Managing your music collection is really simple, and includes a "file-tracking" feature so that if you move files around, you shouldn't lose them from your Amarok database. As you'd expect from Linux software, it's scriptable too - and for those who don't want to write their own, there



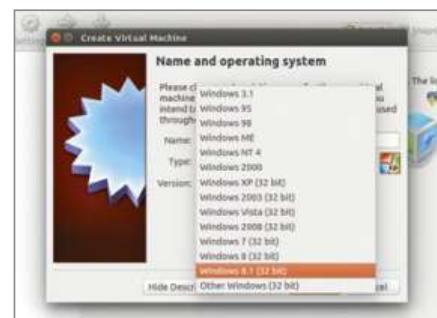
are plenty of community-developed scripts available to do pretty much anything you're likely to want.

VIRTUALBOX

virtualbox.org

VirtualBox is an open-source, cross-platform virtualisation environment that lets you run multiple operating systems at the same time, or run software that isn't available to your OS. This is often essential for Linux users - so it's no wonder VirtualBox is very well developed on the platform. It's not exclusive to Linux, but we've found that it performs best on Linux, and you can bet that any new features will be compiled into Linux first.

VirtualBox really comes into its own when running multiple Linux-based virtual machines. This gives developers a "safe" environment to test software in without the risk of bringing down their entire computer. They're essential for testing, and Linux is the best operating system to run them on thanks to its relatively low overheads.



PACKAGE MANAGERS

All of them

This one's a bit of a cheat, but it's a chance to praise a Linux feature that has also influenced the proprietary computing world.

Package managers such as RPM automate the process of installing, updating and deleting software. Searching for the software you need is a doddle, and once it's installed, the package manager takes care of updating it for you.

If this sounds like the Windows and OS X app stores, it should: both are glorified package managers with pretty front-ends. That Apple and Microsoft should in effect copy the idea from Linux is something we should all acknowledge. It's probably the single-biggest contribution Linux has made to mainstream software.

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- 16 x VPN tunnels with hardware accelerator & VPN Failover
- Advanced Wi-Fi for Vigor2912n



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Buying Time

BEN MANSILL AND THE QUANDARY OF WHEN TO SPEND

It is truly unfortunate that the weakening Australian dollar is currently intersecting with some exciting new product releases. This is a hot topic, and one Bennett touched on in his reviews this month of the new AMD Fury variants, the Nano and the standard air-cooled Fury. As consumers, we may be pining for the newest gear, but when to buy is now a genuine concern for many. As Bennett rightly pointed out, smart shoppers may be better off looking to buy products that were released here many months ago (and to the point – purchased by the reseller when the dollar was stronger).

As you can well imagine, this pain is acutely felt by importers and resellers. Margins on consumer tech are tight, and many smaller shops need to manage inventory with extreme precision these days because being caught out with inventory that's not selling can have a dramatic impact.

When looking at the prices of PC components, as we review products, we

have always taken the view that while an extra \$100 or \$200 may be affordable to most of us, what's more important is what that represents in the bigger picture when doing an upgrade, or starting a new build from scratch. Over the scale of a new PC, that difference could mean stepping up to a better CPU, maybe adding more memory or a bigger SSD. Resellers, too, think the same way, and have responded by offering even more compelling specials and thoughtfully put together bundles. It pays to have a regular look at the home page of the various online resellers, even if you have no solid plans to buy at this stage. We see impressive bargains popping up every day, and while the current situation is far from an economic disaster, scoring a nice something new for yourself also provides a bit of valued support for Australian resellers.

AMD FURY

What a fascinating product the Fury is. It's interesting enough that AMD is

struggling against the dominant Nvidia, and has stacked its long-term future in the high-end gaming space on this new GPU. Equally intriguing is its use of High Bandwidth Memory, and as part of that, whether or not 4GB proves to be sufficient for the current generation – can a smaller amount of memory, but which is faster than traditional GDDR5, still have sufficient bandwidth to churn through large textures without losing frames? Current indications are yes – but only just.

Then there's the issue of drivers. AMD deserves every criticism it gets for poor driver support, it's a disastrous mess for the most part and AMD's constant denial that there's any issue is nothing less than disrespect for its customers. Now, with a new GPU design to deal with, the spotlight is on AMD's driver support more than ever, and not least because the Fury is already behind Nvidia's 980Ti in performance, and that company has the advantage of a familiar and mature GPU to work with, along with more people on the job.



SAPPHIRE RADEON
R9 FURY
36



AORUS X7
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WHAT OUR A-LIST MEANS

Our A-List award is reserved for the best products in each category we review. With a winner and an alternative pick in each, that's 92 products you know are first class.



WHAT OUR AWARDS MEAN

PC & Tech Authority's comprehensive Real World testing sorts out the best products from the pack. Any product recommended by PC & Tech Authority is well above average for features, value for money and performance.



WHAT OUR RATINGS MEAN



HOW WE TEST

Our benchmarking tests are the best in the business. Read on to find how they work...

2D TESTS

Desktop PCs and laptops are tested using our own custom bench testing suite, which has been carefully designed to test all aspects of a system and rate them in a way that's useful to you.

Our benchtesting cover three main tests: a typical video editing test, a demanding 4K video editing test and a multitasking test that stresses all aspects of the system.

We look at the time it takes for each test to run, which is then compared to our reference PC to produce a normalised result. This score is shown on a graph, and to help you understand just where the PC we're reviewing sits in the grand scheme of things, we will often include other system's scores.

The median score of 100 is based on our reference system:

PC & TA REFERENCE PC. SCORE: 100

*Intel Core i5-4670K CPU; 8GB of DDR3 RAM;
AMD Radeon R7 260X graphics card*

On occasion we will run publically available bench testing software, predominantly PCMark 8 from Futuremark. This is run in the Home setting, in Accelerated mode. You can get PCMark 8 as well as 3DMark (below) from www.futuremark.com

3D TESTS

For video cards, as well as Integrated Graphics Processing Units, we use:

- *3DMark Firestrike*
- *Shadow of Mordor*
- *GRID Autosport*

3DMark is designed specifically to test video cards, and you can download and run the same tool as us to help you gauge where your own GPU ranks compared to what we are reviewing.

The two games were selected because they are relatively well balanced in performance between AMD and Nvidia, favouring neither. Both feature a wide range of DirectX 11 shaders. GRID Autosport is fairly easy on GPUs, while Shadow of Mordor is quite demanding, so each provides a helpful gauge for you showing what to expect from a GPU in your favourite games. We will update these to cover DX12 once that API gains traction.

Tests are run using three resolution ranges, depending on where the GPU sits in the market:

Entry level: 1920 x 1080

Mid-range: 1920 x 1080 – 2560 x 1440

High-end: 2560 x 4K

BATTERY TESTS

Screen brightness is set to 120cd/m², playing a 720p video on loop until the device runs out of power.

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NEXT-GEN STORAGE DE-DYSTIFIED

SKYLAKE'S STORAGE BOOST PRESENTS CONUNDRUMS AS WELL AS OPPORTUNITIES FOR NEW BUILDS, AS **BENNETT RING** EXPLAINS

We've recently been treated to a new CPU design from Intel, formerly known as Skylake but now selling under the banner of 6th-Gen Core CPU. Along with it came a bunch of new motherboard chipsets, most of which required new DDR4 memory. Not surprisingly, switching to a system based on this new CPU is a rather expensive platform upgrade, yet the CPU benefits are next to nothing unless you're heavily dependent on the Integrated GPU's performance. However, this new platform does bring another change to the table that is a tad more compelling than the meagre 5% CPU performance increase – better support for high speed storage. Thanks to an increase in the bandwidth between the CPU and the Platform Controller Hub, or PCH. This is the part of the motherboard chipset that, amongst other things, handles I/O for the system's storage. Let's see exactly what's changed, and why it's such a big deal.

DMI 3.0

In Intel's previous premium chipset, the Z97, the PCH was connected to the CPU by DMI 2.0, which had a throughput of 5.0GT/sec (Gigatransfers per Second). This has been increased to 8GT/sec in the DMI 3.0 connection used by the Z170, which is used to deliver extra connectivity options on the PCH. This extra bandwidth is now spread across 26 Flex-IO ports, and these can be assigned to various duties such as PCIe lanes, USB ports, Ethernet connections or standard SATA connections. It's up to the manufacturer to designate how these

Flex-IO ports are assigned, and it's worth noting that faster connections such as PCIe lanes require more Flex-IO ports than slower connections, such as SATA ports. Much ado has been made about the Z170's ability to support up to 20 PCIe 3.0 lanes, but the key words here are 'up to'. In reality, most motherboards won't support anywhere near that, as it would mean they'd have no Flex-IO ports left for your LAN connection or USB ports.

One issue with the configurability of Flex-IO ports is that it can lead to very confusing setup configurations for system builders. For example, using both Ultra M.2 ports on new Z170 boards disables most of the standard SATA ports, which is explained by unhelpful diagrams like this:

- **AHCI mode:**

M2D_32G M.2 connector

Connector	SATA3_0	SATA3_1	SATA3_2	SATA3_3	SATA3_4	SATA3_5
Type of SSD	SATA Express		SATA Express		SATA Express	
SATA SSD	✓	✓	✓	✓	✓	✓
PCIe x4 SSD	✗	✗	✗	✗	✓	✓
PCIe x2 SSD	✓	✗	✗	✗	✓	✓

✓ : Supported, ✗ : Not supported

M2H_32G M.2 connector

Connector	SATA3_0	SATA3_1	SATA3_2	SATA3_3	SATA3_4	SATA3_5
Type of SSD	SATA Express		SATA Express		SATA Express	
SATA SSD	✗	✓	✓	✓	✓	✓
PCIe x4 SSD	✓	✗	✓	✓	✓	✓
PCIe x2 SSD	✓	✗	✓	✓	✓	✓

✓ : Supported, ✗ : Not supported

As a result, it's worth figuring out exactly which peripherals can fit into a motherboard before reaching for your credit card. Now that we've pointed out our major concern with the boost in bandwidth that Skylake brings to peripherals, let's take a refresher of the major new connection types available.

M.2

Formerly known as the Next Generation Form Factor, this replacement for mSATA drives uses a special port to connect SSDs. These ports can usually be found sitting between the PCIe slots on the motherboard, and Z170 has allowed motherboard manufacturers to deliver multiple M.2 slots of the highest speed. The speed of the port varies depending on the type of PCIe lanes that it uses, as well as the number of PCIe lanes. They can be either PCIe 2.0 or 3.0 variety, with the latter offering faster speeds. The port can also use between one and four lanes. Entry-level M.2 drives are usually PCIe 2.0 x2, which delivers a theoretical peak transfer of 8 Gb/sec, while the best on the market use PCIe 3.0 x4, which has a peak maximum throughput of 32 Gb/sec. The latter are now commonly referred to as Ultra M.2 drives and ports. Both compare well to SATA 3, which has a theoretical maximum speed of 6 Gb/sec. Like a SATA port, M.2 ports can be configured to run in AHCI or RAID mode.

It's worth pointing out that the speed of the SSD needs to match the speed of the port. For example, putting an M.2 PCIe 2.0 x2 SSD into an M.2 PCIe 3.0 x4 slot won't utilise the full speed of the port. The

✓ This table, from Gigabyte's Z170-series motherboard manuals, takes serious head-scratching to properly understand when configuring a new build's SSDs

FAIL



▲ Via adaptors, the M.2 interface supports other standards, including NVMe

opposite is also true – if you put a faster drive into a slower port, you're wasting the drive's potential.

As we found out when recently building a Z170-based system, using both M.2 ports on a motherboard has the nasty side-effect of knocking out most of the Intel-powered SATA ports. However, if the motherboard employs an additional SATA controller, such as the ASMedia controller, they should still be available even when both M.2 ports are in use at their fastest achievable speed.



▲ The connector-hungry SATA Express cable, useful for exactly nothing at this stage

One last thing to note about M.2 drives is the various physical dimensions they come in. Four widths are available, 12, 16, 22 and 30mm, along with eight lengths, of 16, 26, 39, 38, 42, 60, 80 and 110mm. Most motherboards support 22mm width SSD drives at three different lengths.

SATA EXPRESS

Otherwise known as SATAe, this high speed performance is meant to rival M.2. A SATAe port usually combines two standard SATA 6 ports alongside a smaller plug, and most new Z170 boards have either one or two SATAe ports on them. Its maximum theoretical performance is 10 Gb/sec, which probably explains why M.2 is becoming the dominant standard. In fact, we've yet to see a SATAe SSD land in our labs.

NVM EXPRESS

Just as we're starting to see M.2 become the new standard for high-speed storage, along comes Intel with NVM Express to add some more confusion to the mixture. This replaces the AHCI standard, and is designed specifically to make the most of SSDs' unique properties. NVMe drives can be plugged in via several methods, but they all require four lanes of PCIe Gen 3.0. The most painful method is to use a SFF-8639 to SFF-8643 cable, but your motherboard will need an SFF-8643 port, aka mini-SAS. MSI recently showed off an adapter card that converts an Ultra M.2 slot into an SFF-8643 port. A much simpler method of connecting an NVMe drive is via the motherboard's PCIe slots, where it will require a PCIe 3.0 x4 slot with a physical length of x4.

Due to its reliance on four lanes of PCIe 3.0, it has the same theoretical maximum bandwidth as an Ultra M.2 slot, but it's far more likely to hit it thanks to the special NVMe interface. Existing NVMe drives are hitting real world speeds of 3.1GB/sec, which is much faster than AHCI M.2 drives. Intel's SSD 750 Series uses NVMe and comes in two flavours, connected via a PCIe slot or SFF-8643 adapter.

Samsung 850 EVO 2TB SSD

HOW DOES ITS NEW CONTROLLER PERFORM?

We pity the poor SSD makers who have to face off against Samsung. The Korean giant has dominated solid state storage since releasing the original 850 Pro back in July of last year, highlighting the benefits that come when every component is built in-house. Soon after came the 850 Evo, trimming performance in return for a more palatable price tag, and today we're checking out an updated version of Samsung's affordable performer. Not only is it the largest consumer SSD ever released at a whopping 2 Terabytes, it's also using a new controller, the silicon that determines just how fast an SSD performs. Can it live up to the reputation of the original 850 Evo?

With a price tag of just over a grand, the cost per Gigabyte of this drive is excellent value, at 55c per Gigabyte. Despite being labelled a 2TB drive, some of the memory is allocated for maintenance, leaving the user with 1862MB of usable storage space. This is provided via eight of Samsung's proprietary 3D V-NAND flash memory packages, each packing

256GB of storage. They're rated to handle up to 150TB of writes, across a healthy five year warranty. These chips are accessed via the new MHX controller, a triple cored ARM-processor that runs at 400MHz and is paired with a 2GB LPDDR3 DRAM buffer. Samsung claims sequential performance figures of 540MB/sec read and 520MB/sec writes.

To put these figures to the test we fired up our standard SSD test, Anvil Storage Pro version 1.1.0.. This free benchmark is one of the best for SSDs, as it tests a wide range of usage scenarios, and can be set to test files of a size larger than the SSD's cache, which exposes flaws when working with especially large files. When it came to sequential performance, we measured 522MB/sec read and 501MB/sec write, excellent speeds very close to those advertised. Looking at smaller 4K QD16 file performance, the drive turned in similarly excellent speeds, of 339MB/sec read and 352MB/sec write.

So then, the new 850 Evo is basically the same speed as its predecessor, and



once again keeps Samsung near the top of the pile, even when compared to more premium SATA-based SSDs. Throw in excellent price per Gigabyte and one of the best warranties in the biz, and Samsung's dominance of the SSD world appears unshaken.

Bennett Ring

KEY SPECS

\$1029 • www.samsung.com.au

SATA 3 (6Mbps) connection • 2.5 inch form factor • AES 256-bit and TGC Opal 2.0 Encryption

OVERALL





Gigabyte GA-Z170X Gaming G1

THE GOD-KING OF MOTHERBOARDS

We can't remember ever seeing a more expensive motherboard, but nor have we ever seen one so packed with features. The GA-Z170X Gaming G1, for Skylake (6th generation) CPUs leaves absolutely nothing to be desired. When you stack up what's included the price is on-target, and while it's not the sort of board you would include in a new build if your needs are basic, after examining every single new Z170 board I found that the Gaming G1's features made it the only possible choice for this editor's new PC build.

Far from being a smorgasbord of every available tech crammed in, the G1 is a thoughtfully designed board that meets very specific needs. Connectivity scores especially well, here. While you have probably read that new 170-series motherboards can support up to 14 USB ports, in the real world it's difficult to find a motherboard (in this initial release phase, at least), with more than six or seven on the back port. The Gaming G1 has 11 on the back panel, (7x USB 3, 2x USB 2/1.1, a Type C and a USB 3.1). Internally there are connections for another four USB 3 via headers, plus four more USB 2). And along with all that you

get a 5.25in front panel for an extra Type C and a 3.1.

To achieve this the Gaming G1 uses three different controllers splitting the duties: the Intel 100-series chipset, a Renesas controller, and, interestingly, Intel's brand new Alpine Ridge controller, and Gigabyte is the only company offering it at this stage. For connectivity this board leaves every other 170-series board in the dust. It's worth noting, too, that the back panel is LED illuminated, which to anyone (all of us) who has fumbled to plug something in, in the dark, is truly the greatest thing ever.

The GA-Z170X Gaming G1 is also one of the only 170-series boards to offer two x16 slots for Crossfire or SLI. Almost every other board drops to 8x/8x when in this configuration. Furthermore, the board offers four PCIe 3.0 slots and another three 2.0 slots. Once again, trumping

most other boards available currently.

While testing the new breed of Z170 boards it became quickly apparent that Intel's 40 PCIe lanes weren't, in the real world, the boon we expected. Severe compromise is needed when configuring a new build if you want to use a PCIe / M.2 SSD. While this is the board to have to give you maximum leg room when configuring a new build, some drawbacks of the Z170 series are unavoidable – installing an M.2 SSD will disable two regular SATA ports and slow another two to half speed.

Onboard audio is simply incredible for a motherboard solution. It is, in effect, a Sound Blaster ZxR sound card. They sell for close to \$300 so you can see what a significant proportion of the price that feature represents, and you will want to plan on using it to see value. I've personally been running a ZxR sound card for a year and testing with the onboard ZxRi showed it to be nearly identical. The discrete ZxR sound is fuller and richer, but only just. It's an excellent solution for those who have become accustomed to superior discrete sound card quality, and can now have it without filling a slot with a physical card.

I'm not sold on the twin Killer 2400 networking controllers. Compared to an Intel-controlled ethernet I get almost identical numbers in ping and speed testing, but in-game I'm routinely seeing 50% higher pings than the Speedtest numbers, and compared to an Intel controller. I uninstalled the Killer apps which allegedly prioritise bandwidth and just installed the network drivers. Straight away pings dropped by up to 50%, and I gained back the 5-6% of CPU utilisation those apps demanded.

As mentioned, I've chosen this board for my own Skylake build. Not because it was the nicest show-off premium board, but because it was the only one that met my USB and SLI needs. The audio is a huge bonus.

A final note – this is an Extended ATX motherboard, but is only 2cm wider than an ATX board. I had no trouble fitting it in an ATX case, but you will want to measure first to be sure.

Ben Mansill

KEY SPECS

\$800 · www.gigabyte.com.au
Socket 1151 · Intel Z170 Chipset · 4x 3666MHz DDR4 (OC) ·
PCI-E 3.0 · 10x SATA3 · 2x M.2 Socket 3 Ports · 3x SATA Express · 1x USB 3.1 Type-C · 11x USB 3.0 (7 rear, 4 internal) ·
2x Killer E2400 Gigabit LAN · Killer Wireless AC · Bluetooth 4.1 · HD audio · HDMI · E-ATX form factor

OVERALL



EXPANSION PACK

SID MEIER'S CIVILIZATION®
BEYOND EARTH™
RISING TIDE



REQUIRES
SID MEIER'S
CIVILIZATION:
BEYOND EARTH
TO PLAY



OUT NOW
CIVILIZATION.COM



Mild themes
and violence,
Online interactivity



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The Nvidia GTX 950

CAN NVIDIA'S BUDGET CARD CUT IT IN A CONGESTED MARKET? **BENNETT RING** HITS THE LABS TO FIND OUT

Pew, what a month it has been for graphics card reviews! Not only did AMD release two new products based on the Fiji chip found in the Fury X, Nvidia then went and surprised everybody with a brand new budget battler called the GeForce GTX 950. We had no warning of its impending arrival, so were taken by surprise when we flew to Sydney for its unveiling. With prices of these cards starting around the \$260 mark, Nvidia is really gunning for the entry-level gamer, and placed a huge emphasis on performance in MOBA games during the presentation. While there's no denying that the GTX 950 delivers solid framerates in DOTA2 and LoL, is it any good in more graphically demanding games?

One of the most interesting slides during Nvidia's presentation was one showing how they'd reduced latency while playing DOTA2, dropping from 80ms on a GTX 650 to just 45ms on the new GTX 950. However, the fix isn't some magical hardware solution – instead they've simply altered the "Pre-rendered Frames" setting that has been in Nvidia's control panel for years, down from two frames to one. It's a software hack that is now handled by the GeForce Experience software, but only a limited number of games will alter this setting.

With that marketing misdirection out of the way, we were keen to see the actual specs of the GTX 950, which Nvidia didn't share at the event. All we knew was that this was a Maxwell 2 flavoured GPU; only now can we see exactly what kind

of cutbacks Nvidia has made to it. The GM206 GPU in the GTX 950 is the same as the one found in the GTX 960, but has had its total number of Streaming Multiprocessors (SMM for short) cut from 8 to 6. Each SMM is comprised of 128 CUDA Cores, so the 950 now only has 768, down from 1024. Texture Units have also dropped, down from 64 to 48, while the ROPs remain the same at 32. 2GB of onboard memory is powered by a 128-bit wide memory bus at a frequency of 6.6GHz, slightly down from the 960's 7GHz. The base speed of the GPU has dropped from 1126MHz to 1024MHz, yet strangely the Boost clock has increased, up to 1188MHz from 1178MHz (Boost clock is the one to care about, as that's what it'll ramp up to whilst gaming).

A result of these changes is an accompanying drop in TDP, down from 125W on the 960 to a very chilly 90W for the 950. A single 6-pin power plug is enough to supply enough juice to keep this card going. As far as outputs go, we're pleased to see Nvidia roll out HDMI 2.0 support at the budget end of the spectrum, along with twin DVI and a single DisplayPort 1.2 (sadly not of the 1.2a variety, which would support Adaptive-Sync displays).

Our two review samples are both priced relatively closely, with the MSI card coming in with an average street price of \$259, while the Galax is slightly more expensive at \$280. At this price they're in direct competition with AMD's R9 380, which sells for around \$300. We just happened to have a 380 in for testing,

GTX 960 BENCHMARKS

3DMARK FIRE STRIKE (1920 X 1080)

	MINIMUM	AVERAGE
GTX 960	7108	
MSI GTX 950	6116	
GALAX GTX 950	6270	
SAPPHIRE R9 380	7770	

GRID - 2560 X 1440, 4XMSAA, ULTRA DETAIL

	MINIMUM	AVERAGE
GTX 960	72FPS	94FPS
MSI GTX 950	62FPS	77FPS
GALAX GTX 950	59FPS	80FPS
SAPPHIRE R9 380	74FPS	89FPS

SHADOW OF MORDOR - 2560 X 1440, ULTRA DETAIL

	MINIMUM	AVERAGE
GTX 960	22FPS	43FPS
MSI GTX 950	21FPS	39FPS
GALAX GTX 950	21FPS	40FPS
SAPPHIRE R9 380	17FPS	46FPS

and also measured the 950s against their bigger brother, the GeForce GTX 960. Due to the vagaries of Australia's IT scene, and the fact that most 960 stock was probably bought on a stronger Aussie dollar, it's currently extremely easy to find a GTX 960 for just \$280.

We'll save the performance discussion for each of the individual card reviews that follow. Nvidia is in a tough position locally due to the crashing Aussie dollar. With all stock of the new 950 having to be purchased on the weak Aussie dollar, the price of the 950 is much higher here when compared to overseas markets. And as a result, it fails to deliver the goods, with older products bought on a stronger dollar much more competitive.

NVIDIA GAME STREAMING

By far the coolest feature unveiled at the 950 launch event was the ability to stream your game's video feed directly to Twitch, as well as directly to a friend. Even better, if the game supports local co-op, your friend can then take control of the second player from their place. The interface to do so is seamless – simply invite a friend to watch your game stream, then switch on the game sharing feature. However, there is a catch that will hurt Australia's primitive copper-based network; the 720p stream requires a minimum of a 7Mbps upload speed, with 10Mbps recommended. Good luck getting that on anything slower than fibre or cable.

MSI GeForce GTX 950 Gaming 2G

A DECENT CARD AT THE PRICE IT SHOULD BE SELLING FOR

MSI has delivered arguably the most affordable variant of the GTX 950 on Aussie shelves, yet has done so without compromising on the quality of the hardware within. It's got one of the best factory overclocks on the market, not to mention an excellent cooler that is vastly superior to the reference unit (as shown on the facing page). Let's take a closer look.

MSI has endowed its 950 with the venerable Twin Frozr cooler which has featured on a great many MSI cards



over the years, and has evolved, this time to version V. The twin fans vary in speed depending on which profile the user selects via the MSI software – OC, Gaming or Silent. The GPU frequency in turn is also altered, with the Boost clock topping out at 1317MHz, 1279MHz and 1190MHz respectively. OC mode brings an unbearable level of fan noise with it though, so we tested with the MSI software disabled, which uses stock reference clocks.

Like many new graphics cards, this one also disables the fans when the card is running below a certain temperature, ensuring its silent operation while in 2D desktop mode.

As our benchmarks show, at stock speeds this card is slightly slower than the Galax, but enabling the MSI software and activating Gaming mode should bring it up to the same level. Considering its \$20 cheaper, MSI's version is the better buy, but both cards are smacked down by the identically priced GTX 960, while spending just \$40 more gets you



an AMD R9 380, which is a much more powerful product.

MSI isn't to blame for Australia's weak dollar, of course, but that doesn't mean this version of the GTX 950 is currently a good buy. Hopefully prices will come down as the Aussie dollar firms up, making this product more attractive.

KEY SPECS

\$259 · au.msi.com
2048MB GDDR5 memory · 1x HDMI 2.0, 1x DVI-I, 3x DisplayPort 1.2 · SLI-ready · 350W recommended PSU

OVERALL



Galax GeForce GTX 950 Exoc White

WHEN APPEARANCES MATTER

Formerly known as Galaxy, Galax hasn't just ditched the Y in its rebrand – it's now ditching a focus on budget offerings to serve up premium products. Take its version of the GTX 950, which is currently one of the more expensive variants of Nvidia's newest budget solution. In return for a slightly higher price tag, Galax has endowed this card with a beautiful white cooler

and backing plate. It's a stunner of a card, fully deserving of proud placement under a Perspex side window in your PC.

It's also rocking a 4+1 Phase power supply, perfect for delivering the clean, stable power required by the factory overclock (the EXOC in the name stands for Extreme Overclock), yet uses the same 6-pin power adapter. The Boost clock has been raised from the default reference speed of 1188MHz to a hefty 1405MHz, which is a very healthy 18% increase and quite a way beyond what we usually see on factory overclocked video cards. Yet despite this attention to core speeds, the memory frequency hasn't been touched at all, as Galax has kept the stock outputs to that found on all GTX 950s. That said, getting it up to the 7.5GHz mark shouldn't be an issue with the high quality cooling this card is equipped with.

Given the sizeable factory Boost leap, we expected this card to come out on top between the two non-reference GTX 950 cards we are testing here, which it promptly did. Yet even with the GPU



pushed to breaking point, the GTX 950 is still outpaced by the GTX 960, and unfortunately for Nvidia, even more so by the higher-performing and only marginally more expensive AMD R9 380. With Australia's screwed up hardware pricing at the moment, this makes the 950 a rather illogical buy for those on a budget at this stage of the currency exchange rate game.

KEY SPECS

\$280 · www.galax.net
2048MB GDDR5 memory · 1x HDMI 2.0, 1x DVI-I, 3x DisplayPort 1.2 · SLI-ready, 350W recommended PSU

OVERALL



Sapphire Radeon R9 Fury

AMD'S AIR-COOLED FURY WITH A FEW LESS PROCESSORS

While AMD's Fury X graphics card brought some very cool new tech to the table, most notably support for High Bandwidth Memory (HBM), our review concluded that it didn't topple Nvidia's GeForce GTX 980 Ti from the performance throne. It was priced in the same range as Nvidia's flagship product, yet didn't match its performance, with substantial losses in many benchmarks. We knew it wouldn't take long for other products to land that utilise the Fiji GPU powering the Fury X, and this month sees two of them hit the PCTA labs. The Nano is a niche product aimed at power-hungry space-savers, whereas the Fury is focused at a much wider audience – those looking for top tier performance, but who are prepared to shave a little performance off to save a few hundred bucks. And that's exactly what the Fury has done.

As expected, the Fiji chip used in the Fury is basically a pared-back version of the Fiji found in the Fury X. It's likely that these chips haven't passed the stringent tests required for full Fury X performance, with possible flaws in certain sections. It's a common approach used across the GPU industry, and as such, the total number of Stream Processors has decreased from 4096 in the Fury X



> AMD house Sapphire always deliver non-reference cards designed with care



down to 3584 in the Fury. Accompanying Texture Units have also dropped, from 256 to 224, but interestingly the ROPs remain identical, at 64. Considering that the ROPs were considered by some to be a bottleneck in the Fury X, it's possible that the Fury might perform much more closely to the Fury X than we'd otherwise expect. The Fury's chip has also had a slight speed decrease, with the Boost clock dropping to 1000MHz, a small 50MHz dip compared to the Fury X. Meanwhile everything else remains identical, including the ridiculously wide 4096-bit memory bus delivered by the HBM modules. As with all HBM v1.0 products, the Fury is limited to 4096MB of memory – read this issue's Nano review for a refresher on why this could be an issue in especially demanding situations.

The TDP of the Fury remains at 275W, identical to the Fury X, and it's also running the exact same outputs, in the form of three DisplayPort 1.2a and one HDMI 1.4a. We can't wait for AMD to finally jump aboard the HDMI 2.0 bus, but it seems the Fury isn't going to be the product to do it. All of AMD's proprietary technologies are supported by Fury, including CrossFire, Virtual Super Resolution and FreeSync. Unlike the Fury X, manufacturers are free to use their own card designs, which is why Sapphire has gone with its Tri-X cooler. This uses three 90mm fans over a copper heatpipe design, and it's rather large to accommodate the 275W TDP, measuring a huge 36cm inches in length.

When it came time to test performance, we were pleasantly surprised to see the Fury only trailing behind the Fury X by around 6% or so. Considering the relatively large

number of Stream Processors that have been disabled, we expected more of a performance drop, but it wasn't to be.

In the US, the price of the Fury compares very favourably to that of the Fury X, coming in at around \$100 cheaper, with an RRP of US\$549. That's around 20% cheaper, for just 6% lower performance. However, the price story here in Australia is very different. The Sapphire Fury has an average street price of \$999, yet it's possible to pick up a full-blown Fury X for just \$40 or \$50 more. In this instance we'd suggest spending that little extra is worth it, not least for the excellent water cooling solution that comes with the Fury X. The story gets worse when we include Nvidia's products, with entry-level variants of the GeForce GTX 980 Ti now widely available for just \$990. At that price, there's simply no competition – the 980 Ti runs rings around the Fury. If and when prices of the Fury drop then it might become the right card to buy, but at this moment in time the GeForce family gets all the glory.

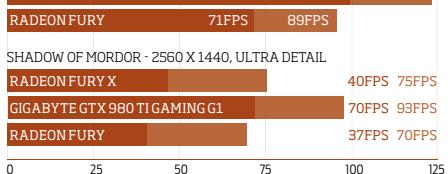
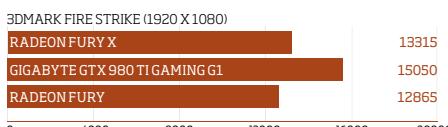
Bennett Ring

KEY SPECS

\$999 • www.sapphiretech.com

x 8-pin power plugs (suggested 750W PSU) • 1x HDMI 1.4a, 3 x DisplayPort 1.2a • 4GB memory • CrossFire ready

OVERALL



MSI GTX 980 Ti Lightning

A ULTIMATE GRAPHICS MONSTER

It is now clear that the Maxwell-based 980 Ti is the star card of a generation. The stock version is up to 50% faster than the regular GTX 980, which is the biggest generational jump in performance seen in several years. It trounces AMD's Fury by 10%, or more (although AMD is working with an all-new architecture so its drivers need to mature), and it stomps all over Nvidia's own \$1600 Titan X, for a quarter less the price.



PC & TECH AUTHORITY
RECOMMENDED

Not only is the 980 Ti a star performer in stock configuration, we are now seeing its impressive overclocking headroom thanks to increasingly effective custom cooling and accompanied factory overclocks. In PCTA 214 we reviewed the MSI GTX 980 Ti 6G, and promptly placed it in our Kitlog Perfect PC. A stock 980 Ti has a Base clock of 1GHz. The MSI GTX 980 Ti 6G featured a Base frequency of 1178GHz, which boosts to 1270GHz. The Lightning, however, comes with an out-of-the-box factory overclock Boost speed of 1304GHz.

This is achieved thanks to the heavy-duty cooling. It's big and it's heavy, and it's intended to help overclockers achieve even higher levels of performance. For regular gamers, even those who regard themselves as hardcore, this card is overkill. Even with the big marketing push we're seeing from all quarters about '4K gaming', even a regular 980 Ti will do most high-res gaming jobs well. MSI, as the company always has with its Lightning brand, is

giving enthusiasts a tool to push towards breaking some overclocking records.

The (dual) BIOS features a 'LN2' (liquid nitrogen) mode. Switching to that pushes up the GPU voltage limit to up to 1.3 Volts. It's in this territory that prospective owners really do need to be comfortable and knowledgeable about overclocking. It's not for gung ho gamers to slide the bar to max and hope for the best.

Despite the beefy cooling the card runs almost whisper quiet. As with all 980 Ti cards we have seen so far it also sports 6GB of memory, which is the new hot zone for gaming at higher resolutions. This is the new single-GPU champion.

Ben Mansill

KEY SPECS

\$1230 · www.msi.com.au
6GB GDDR5 · Boost/base clock: 1304/1203GHz *
330*140*53mm / 1365g · DisplayPortx 3 · HDMI · DL-DVI-I

OVERALL



Antec.

Signature | S10 · S10G
SIGNATURE SERIES
DESIGNED TO INSPIRE

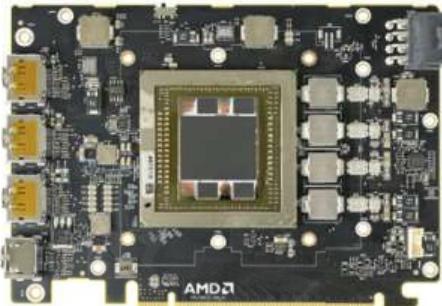


AMD Radeon R9 Nano

THE WEIGHT OF THE AMD'S FORTUNES RESTS ON THIS LITTLE BATTLER'S SHOULDERS

Times are tough for AMD. According to Jon Peddie Research, overall sales of discrete GPUs have slowed down, with a whopping 22% slump in desktop graphics card sales year on year as embedded GPUs continue to grow in popularity. Worse still is news that AMD's slice of the rapidly diminishing pie is getting smaller. As of the last quarter, Mercury Research showed AMD powered just 18% of the discrete GPUs found in gaming machines, with Nvidia controlling

✓ Can AMD reinvigorate the small form-factor gaming PC with the Nano?



the other 82%. With numbers like these, AMD needs a win to help turn its fortunes around, yet the recent release of the Fury X sadly seems to have missed its mark. Thankfully there are two new products on the market based on the same technology as the Fury X which seem to tell a more compelling story – let's start with the smallest of the siblings, AMD's revolutionary Radeon R9 Nano.

As the name suggests, this card is small, but it's not until you set your eyes on the actual product that you'll realise just how tiny it is. Measuring a mere six inches in length, it's barely longer than the PCI Express slot that it sits in, and will easily fit inside a cramped Micro-ATX build. AMD has been able to create such a tiny product thanks to the use of High Bandwidth Memory, or HBM for short. This new memory type removes the large packages of memory that surround the GPU on traditional video cards, instead replacing it with exponentially smaller vertical stacks of memory that sit on a special layer around the GPU, called a Transposer. In the case of the Nano, the

entire GPU and memory package is just over 1000 square millimetres, which has allowed them to create such a tiny graphics product.

As you've probably learnt from the Fury X reviews, there's one slight problem with the new HBM memory. It's currently limited to a maximum amount of 4096MB; only when Version 2.0 of the

OTHER HTPC OPTIONS

The Nano isn't the only small form factor graphics card on the market, but it is the most powerful. Until now, the next best option was a miniaturised Nvidia GTX 970, which offers around 70% of the performance. Yet it costs just \$500, making the Nano's extra 30% in performance cost an eye-watering \$700. There are also a myriad of lower performance graphics cards on the market that will easily fit inside a HTPC, with dozens based around the GTX 750, but they're in a different league entirely.



technology launches in mid-2016 will we see this increase to 32GB. That's exactly when NVIDIA is planning on adopting the technology. With AMD pushing the Nano as a 4K-ready card, the ceiling of 4GB of memory could prove to be a problem in especially memory-hungry games. We tested this during our Fury X review by running Grand Theft Auto V in two modes. The first had a memory footprint of almost 6GB, while the second dropped this to 4GB but put the GPU under the exact same load from a processing perspective. In the first mode, when the Fury X ran out of memory and had to fetch new data over the sluggish PCIe bus from the system RAM, the minimum frame rate dropped to just 2.4 frames per second. Mode two saw the card maintain a minimum framerate of around 15fps, the same speed as the likes of the GTX 980 Ti. It clearly illustrates that if a game requires more than 4GB of video memory, the Fury X, and likewise the Nano, simply aren't up to the task. The good news is that the number of games requiring more than 4GB of memory can be counted on one hand, but it's worth keeping in mind

THE MISSING LINK - HDMI 2.0

AMD's Fiji-based products lack a feature that has upset many – a HDMI 2.0 connection. It's going to become even more of an issue for the Nano as this is rapidly becoming the defacto standard for connecting 4K TVs to a HTPC, as it has the bandwidth required to drive 3840 x 2160 panels at 60Hz. Unfortunately the Nano only has a HDMI 1.4a output, like all of the other Fiji products, limiting it to just 30Hz over HDMI at 4K. However, it does include DisplayPort 1.2a ports, which does indeed offer 60Hz 4K performance, and is available on most 4K TVs. Note the use of the word *most* though? When we attended the Sydney launch of the Fury, we asked why AMD hadn't included HDMI 2.0. While the company official dodged the question, he pointed out that DisplayPort 1.2a to HDMI 2.0 adapters are due later in 2015. We've yet to hear of any such device though, and have heard that creating such an adapter is a much more complex issue than AMD would suggest. As such, the decision to leave HDMI 2.0 off a graphics card that is apparently designed to power 4K TV sets is utterly baffling, and is a big black mark on the Nano's score card.

ou plan on using AMD's HBM-based cards for the next few years, when it will likely prove to be more of an issue.

Despite the Nano lacking the integrated water cooler of the Fury X, the GPU under its tiny heatsink is a fully fledged Fiji GPU, the same as the one found in the Fury X. It has the same 4096 Stream Processors, 256 Texture Units and 64

“There’s simply no other card of this size that can compete with the Nano”

ROPs of the Fury X, while the identical 4096-bit memory bus provides oodles of bandwidth. AMD claims that it even runs almost as fast, with a 1GHz Boost clock compared to the Fury X's 1050MHz. So how has AMD managed to drop the TDP of the Nano down to 175W, a huge 100W drop over the Fury X's 275W, which is even higher in the real world?

It turns out that despite the claims of a 1GHz boost frequency, in practice the Nano throttles down significantly. Unlike the Fury X, it's not locked to the Boost frequency, and will only hit it in very rare circumstances. Instead, the GPU automatically downclocks when it hits

▼ On a Micro-ATX motherboard the Nano is right at home

the 175W TDP. During our testing, we saw the GPU frequency fluctuate between 850MHz and 900MHz, depending on how taxing the benchmark was. As a result, it's significantly slower than the Fury X, yet manages to remain rather close to the other new AMD product, the Fury. With a gap of around 6% behind the Fury, there's simply no other card of this size that can compete with the Nano.

Due to its intended use in HTPCs and living room game boxes, we paid especially close attention to the cooler on the Nano. AMD has gone with a single fan design, which pushes air in two directions. Some spills back inside the PC case thanks to the vents underneath the cooler, while the rest is expelled out of the rear of the case courtesy of more vents on the mounting plate. It's using the same copper vapour chamber/heatpipe with aluminium cooling fins solution found on most graphics cards. We measured the fan noise while the card was under load, and recorded 46dB. That's 1dB more than the Fury X, and is overall an excellent result. It's not quite silent, but can easily be ignored in the heat of battle.

For its price it doesn't really have any competition. The closest we can think of are the Micro-ATX versions of the R9 380 and GTX 970, but neither of these are in the same league of performance... nor price. With the average street price of the MSI and Sapphire versions of the Nano coming in at \$1169, this is a very expensive product indeed. Whether it's worth that depends entirely on how badly you want your living-room PC to fit inside the shelf space usually occupied by a DVD player.

Bennett Ring

KEY SPECS

\$1169 • www.amd.com

1x 8-pin power plug • 3x DisplayPort 1.2 and 1x HDMI 1.4 • 4GB memory; CrossFire ready

OVERALL



Cooler Master MasterCase 5/Pro

GETTING ALL THE LITTLE THINGS RIGHT

Despite the vast number of cases you can choose from, real innovation is rare. Mostly it comes down to a style decision, which is nice when building a new PC to give it a sense of fresh newness, but building (and subsequently adding-to) a PC with a case that's especially enjoyable to work in, and flexible to customise, is a sweet joy. Last issue we reviewed the monstrous Antec S10, which is a super-premium \$700 case (and worth it). This month we have another uniquely interesting case, but for different reasons.

The Master Case's claim to fame is its open flexibility. The whole idea is that it's all about modularity and customisability. The stock case's various bits can all be removed, with your build only including what's needed. Extra bits can be ordered online later, and the grand plan, still to come, is that you will be able to customise your initial order from Cooler Master direct to only include the bits you want. It's this, plus the way you can actually build it without fiddle to be just as you want it that justifies Cooler Master's 'Build it your way' tagline.

For now, it comes in two flavours. The stock model, and the Pro, which includes extra drive bays plus a proper top cover. Without the nice top cover I think the stock version looks incomplete. The exposed mesh, screwed into place, looks unfinished. It looks like you've left a panel off by mistake. That's compounded if you add the water cooling radiator bracket to the top. It's like not having a car door panel, with just the innards exposed. It looks wrong. Get the Pro, or order the top panel separately.

The top panel turns out to be the only niggle. If you don't have it the case looks incomplete – but if you do it won't lock into place, and can't be fastened. It just sits there loose, and the lightest touch sees it sliding away.

I like the styling, personally. The finish is a nice matte black and the angular edging gives it a 'stealth jet' look, without being too ridiculously over the top. The drive bays, being the downfall

of most poorly-designed cases, come up trumps here. At the top is a 5.25in bay which can accommodate two standard devices, or one double-bay unit. If you have no intention of using this it can be removed completely. Under that are stacked 2.5in/3.5in bays. Each one holds two drives, which are slotted into place without the need for screws or tools. They seem sturdy enough. A total of six drives can fit in the top area of the chassis, and another two-drive bay can be installed under the metal panel that separates the top motherboard area from the PSU area. That panel, incidentally, runs the length of the case and effectively isolates the two heat-generating zones.

The nice thing is that you only need to install as many drive bays as you require. Now, while this concept is hardly revolutionary, it's the brisk ease that each bay is installed, or removed, that makes it shine. Two large thumb screws hold each into place and – as with all aspects of this thoughtful design – there are no fiddly protrusions or whatnot to make the task a hassle. This makes it easy to maximise airflow from the front area through and over the motherboard and components. A 140mm fan is included in the front area, and up to three of these can be installed, or 3x 120mm if you prefer.

Where it really stands out, though, is that if you're installing SSDs (or laptop 2.5in HDDs) there are two flush mounting brackets along the bottom of the metal section divider, and another two on the back panel behind the motherboard. They allow, in effect, you to directly mount drives on the case surface where they take virtually no space. If you're aiming for a thoroughly modern build based on SSDs-only then you can remove every one of the standard drive bays creating a totally open unimpeded airflow from the front fans



over the entire internal area. We saw this in Cooler Master's Cosmos series, too.

It also has the nicest radiator installation I've ever enjoyed. The included bracket takes one or two 120mm fans plus the radiator itself. Just screw it to the cooling components before installation and drop it into place, securing it with eight screws. It's flawless for top mounting, and negates any hassles you might have experienced in the past with having to pre-install the radiator and fans before jamming the motherboard into place. It can be mounted on the front surface, too, but doing so robs you of drive bays.

We built a test PC in the Master Case and every step was stress free. Our build dispensed with drive bays, and has 3x 140mm fans spinning lazily at 1200 RPM, all wafting considerable uninterrupted air over the entire internal area. Everything fits, everything's easy. In most other cases something always frustrates, or must be compromised. Not so here.

Ben Mansill

KEY SPECS

\$170, \$219 (Pro) • www.coolermaster.com
Mini ATX • Micro ATX • ATX • 2x USB 3 top ports • 2x 140mm fans (3x in the Pro)

OVERALL



Shuttle DS57U Slim PC

SMALL AND ROBUST COMPUTER DESIGNED FOR PERMANENT INSTALLATION

Shuttle has long been known for their small form factor computers and their latest release is the Slim PC DS57U. Made for the industrial market, this silent and fanless little box houses a variety of low power Intel CPUs but still packs in all the features you could reasonably need.

The first sign this computer is for the industrial and installation market is that there's two serial ports on the front and bare pins on the rear for CMOS clearing and an external power switch. Inside there's two Mini PCIe slots, one full size for an mSATA SSD and the other half-size for a Wi-Fi module or LTE modem. There's space for a 2.5inch disk drive and two DDR3-L 1600 SO-DIMMs. In addition to those ports are two gigabit Ethernet ports, HDMI, DisplayPort, 2x USB 3.0, 4x USB 2.0,



SD card slot and 3.5mm audio out and in. All the units are sold barebones, allowing you to configure the storage and RAM mix to your needs.

The Slim PC DS57U is housed in a tough metal body that gets warm to the touch due to the fact there's no moving parts. If an SSD is installed, it fully leads to many hours of uninterrupted use. Note however, that the operating temperature is 40°C. To keep heat and size to a minimum, the Shuttle DS57U has a range of the latest Intel Broadwell CPUs available - the Celeron N3150, i3-5005U, i5-5200U and i7-5500U. These CPUs are common in ultrabooks, so performance is close to that of a laptop. As compact as this machine is, there is a sizeable 65W external

power supply, unlike Apple's Mac Mini which manages to be roughly the same size as the DS57U, yet has an internal power supply.

The tiny PC space has burgeoned lately, with most OEMs offering some sort of compact solution. Whilst Shuttle's DS57U is designed for a more industrial use, it comes at a price. A similar spec Intel NUC can be had for almost half the price of the Shuttle, so you'd really need the more industrial robustness type features to make it a worthwhile purchase.

Anthony Agius

KEY SPECS

\$399 · <http://au.shuttle.com.au>

Intel Celeron 3205U · i3-5005U · i5-5200U · i7-5500U CPUs
2x DDR3L SO-DIMM slots · HDMI & DisplayPort dual display
· dual gigabit Ethernet · 802.11n Wi-Fi · 4x USB 2.0 · 2x USB 3.0 · SD card slot · full size & half size Mini PCIe mSATA slots

OVERALL



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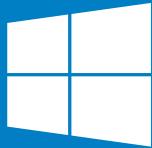
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*Games and media content sold separately.





Aorus X7 Pro-Sync

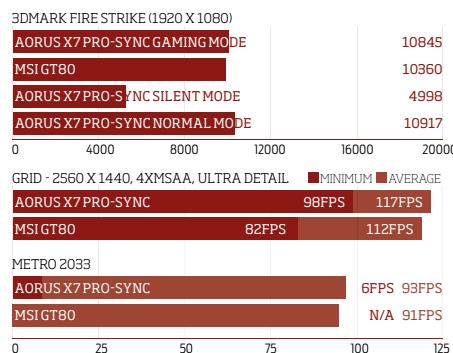
GET YOUR EARPLUGS READY

It's possible to pick up a decent gaming laptop for around two grand these days, so when we saw this new 17 incher from Aorus cost twice that, we knew it was going to be packed to the gills with high-powered goodness. Closer examination revealed that this is indeed a gaming thoroughbred, but once again we see Aorus hitting the limitations of mobile computing – there's only so much hardware you can pack into a base that is a centimetre or two deep before heat becomes a real issue.

Despite the large screen size, Gigabyte has stuck with a relatively low-res 1920 x 1080 IPS display. Thankfully pixel structure isn't too noticeable though, and it's a beauty when it comes to colour and contrast performance. It's also got a rather large ace up its sleeve in the form of full G-Sync compatibility, which is a killer feature in performance-limited

laptops. Not that this machine is lacking in the grunt department...

Powering the display is not one, but two Nvidia GeForce GTX 970M GPUs. Each of these are roughly equivalent to a desktop GTX 960, so have ample power to drive the 1080p display when run in SLI mode. Even the most demanding games should run at around 40 frames per second, which is very playable when G-Sync is engaged. There's one major issue with these GPUs though, and it's their temperature. This laptop is incredibly shallow considering it's packing twin GPUs, with a height of just 22mm. This means the fans within have to work overtime to keep the 970M processors nice and cool, which results in simply atrocious fan noise. The fans can be set to one of three modes – silent delivers a whisper quiet machine, but performance is halved. Normal and Gaming mode seem to be functionally identical, with a fan noise of a whopping 57dB, and almost inseparable benchmark results. That's about the same as a noisy dishwasher, or three people having a conversation, and will prove to be hugely annoying unless noise-cancelling headphones are employed. We're all for Aorus shoving potent hardware into their laptops, but the noise issue is getting out of hand. We'd much rather a laptop that was an extra centimetre deep, but didn't sound like Bronwyn Bishop's helo taking off for a power lunch with pals.



As expected, the rest of the hardware within this laptop is top-notch. Intel's 5th Gen. Intel Core i7-5850HQ is built using a 14nm process, but any power savings this brings to the table will likely be swallowed whole by the power demands of the graphics subsystem. 16GB of DDR3 1866MHz memory is plenty, while twin 256GB SSDs in RAID 0 mode is a little small for our liking – Aorus usually backs this combo up with a 1TB HDD, which is strangely absent this time around. Killer's budget LAN solution is included, and given PCTA's recent experience with this chipset on the desktop, we kind of wish it hadn't been. Intel's NIC solution might cost a little more, but it just works.

We fired up our usual suite of benchmarks, and also threw in Metro Last Light just to punish the system a little more. These are the same tests we recently ran on MSI's massive GT80 Titan SLI behemoth, which packs twin 980M GPUs. To our surprise, the Aorus managed to take the lead in all of our benchmarks. This could be a result of newer drivers, or a more aggressive cooling solution that lets the 970M GPUs really stretch their legs, as the GT80 wasn't quite as rowdy.

There's no denying Aorus' latest gaming laptop is fast, but the fan noise really is a major issue. We can't imagine gaming with such loud fans, hour after hour, is going to be a whole lot of fun, though a pair of active noise-cancelling headphones would go a long way to solving his issue. Perhaps Aorus should consider including a set in the box...

Bennett Ring

KEY SPECS

\$3999 · www.aorus.com

17.3 inch HD IPS G-Sync display · 2 x 256GB SSD in RAID 0 · 5th Gen. Intel Core i7-5850HQ (2.7GHz – 3.6GHz) · 2 x Nvidia GeForce GTX 970M GPUs in SLI mode

OVERALL



Samsung Galaxy S6 Edge+

SAMSUNG'S OVERSIZED GALAXY S6 EDGE+ IS A RARE BEAUTY, BUT EXPECT IT TO BLOW A CRATER IN YOUR BANK BALANCE

Sometimes all you need is good looks. The Samsung Galaxy S6 Edge isn't quite that shallow, but its seductive curves certainly catch the eye. Its larger sibling, the Samsung Galaxy S6 Edge+, has just been unwrapped by Samsung and provides more substance to the world's sexiest smartphone.

The S6 Edge+ is a larger version of the Galaxy S6 Edge. It's clad in glass at the front and rear, and uses Gorilla Glass 4 to prevent scratches and more serious damage. The camera unit at the rear sticks out, just like the S6 and S6 Edge, and the twin curves either side of the main display remain in place.

Its Super AMOLED screen measures 5.7in diagonally, with a Quad HD (2,560 x 1,440) resolution (just like the Galaxy Note 4 from last year) and it's ludicrously sharp, with an ultra-high pixel density of 518ppi.

Embedded in the slim metal frame you'll find the phone's buttons and ports. The volume controls are on the sliver-thin top-left edge, with the power button on the opposite side. The 3.5mm headphone jack and micro-USB charging port are on the bottom edge next to the single speaker grille, while the phone's nano-SIM slot is located on the top edge.

It's a gorgeous handset, but those hoping that Samsung might bring back the microSD slot will be disappointed: just like the S6 and the S6 Edge, there's no easy way to get inside the phone. You can't replace the battery, and there's no way to expand the storage.

However, Samsung has made a couple of hidden improvements to the phone's design, claiming a 1.7x increase in structural strength over the S6 Edge, and a 1.3x improvement in scratch resistance.

But what's really impressive about the S6 Edge+ is how compact it feels in your hand, despite its enlarged dimensions. When it comes to features, the key thing to note is that the S6 Edge+ isn't part of Samsung's Note family. Although Samsung has launched it alongside the Samsung Galaxy Note 5, it has no S Pen



stylus. Instead, the key feature is the twin-edge design. In addition to being able to set up a number of favourite contacts and call or message them, it's now possible to send "pokes" and emoticons directly from the Edge screen – although this feature only works with other Samsung phones.

Not convinced yet? Swipe across the edge, and you'll find the secret weapon: the Apps Edge. Here you can add shortcuts to your favourite apps, to access them with a quick swipe and tap. This is a feature you may remember from the Samsung Galaxy Note Edge, but there's no sign yet of that phone's extra enhancements. The Note Edge featured not only contact and app shortcuts, but extra edge screens, from a ruler to a stopwatch. Samsung even conveniently put camera and music controls on its original Edge screen. Although I haven't had an opportunity to run any benchmarks yet, I expect a similar set of results to the S6 and S6 Edge. That's because it shares a core set of features. The main power behind the phone is the same 14nm Exynos 7420 octa-core SoC, comprising twin quad-core CPUs running at 2.1GHz and 1.5GHz.

Alongside this powerhouse is 4GB of LPDDR4 RAM – a smidgen more than in the smaller S6 Edge – and either 32GB or 64GB of storage. The battery will be a larger 3,000mAh unit (the S6 Edge has a 2,600mAh battery). Whether or not this leads to longer run times is unclear, but, given the larger screen, I suspect that the S6 Edge+ won't last a great deal longer than its smaller siblings.

Despite the larger battery, the phone should charge up quickly. Due to improvements in wireless charging hardware, Samsung says the Galaxy S6 Edge+ will charge 27% faster than the S6. It also hasn't neglected the wires, with the new handset taking only five minutes

longer to reach 100% on the battery gauge when charging via USB.

In terms of wireless connectivity, the S6 Edge+ now supports up to Cat9 4G (450Mbps/sec download speed) on compatible networks, has dual-band 802.11ac Wi-Fi with 2x2 stream MIMO, plus ANT+ as well as near-field communication (NFC) function.

Samsung hasn't introduced any new camera technology with the S6 Edge+: it has the same rear 16-megapixel camera and front 5-megapixel camera as the S6 and S6 Edge. With the combination of optical image stabilisation, a large f/1.9 aperture and hybrid phase/contrast-detect autofocus, I fully expect it to match its smaller cousins for quality. However, Samsung has introduced some new camera features via software, notably a video digital image stabilisation system (VDIS). This adds stabilisation to the front and rear camera, and introduces face tracking. The phone also has automatic video-editing modes, including Collage and Series, and Samsung is introducing a live-broadcasting feature in its camera app, based on YouTube's technology.

There's also 24-bit/192kHz audio upscaling for your MP3s, improved audio hardware, and support for Samsung's new Bluetooth codec – UHQ – for better audio quality over wireless headphones. The phone will also run Samsung's TouchWiz launcher software, this time on top of Android 5.1 Lollipop.

Finally, Samsung's new SideSync 4 desktop software includes automatic wireless connection that works over your local Wi-Fi network.

There's even a natty keyboard case that makes the S6 Edge+ look like a giant BlackBerry. Keyboard warriors and BlackBerry lovers (there must be some left, right?) shouldn't get too excited, though – some keys weren't 100% responsive, needing to be stabbed a few times before the letters eventually appeared onscreen.

The Samsung Galaxy S6 Edge+ is a fantastic piece of hardware. It looks as good as the S6 Edge, and by minimising the bezel and shaving weight off the handset, Samsung has delivered a device that's about as small as you could imagine for a 5.7in screen.

Combined with Samsung's camera technology, a large 3,000mAh battery and a plethora of features, you have a killer combination. The only problems are the lack of microSD slot and the price. The 32GB version is \$1,199, with the 64GB version available for a pricier \$1,299. That definitely doesn't stop me wanting one very much, though.

Jonathan Bray



Nokia N1

A NEAR-PERFECT ANDROID TABLET, BUT WITHOUT AN OFFICIAL AUSTRALIAN SUPPLIER IT'S HARD TO RECOMMEND

It's not often that we review products without an official distributor in Australia – but the Nokia N1 tablet is a worthy exception, and grey importers and eBay sellers mean you can get one for around \$300, if you really want.

Normally, I wouldn't recommend this as a route to buying a product. Unless you're purchasing it from a reasonably reputable importer, the chances of getting a replacement if it's faulty are minimal. Service and support will be hard to come by, and you'll have to deal with rough edges such as foreign power adapters.

That said, the N1 is still an attractive prospect. It's not only one of the nicest-looking Android tablets I've seen, it's probably the best. It's good enough to make me think that it could win over people who started wanting an iPad.

It helps, of course, that it looks like an iPad. The screen specs are identical to the iPad mini 3, with a 4:3 aspect ratio and incredibly sharp 750x1,536 display. It hits 410cd/m² at maximum brightness, with superb colour accuracy and excellent contrast. The case is well-engineered aluminium, and the curved edges remind you immediately of Apple's devices.

> The Nokia N1's curved edges immediately remind you of Apple products

My only quibble over the physical design is that it feels a little top-heavy when held in portrait mode. Nokia has attempted to evenly distribute the weight throughout the body, but this makes it feel a little heavy. This is a tiny detail, though.

Internally, the N1 is very different from the iPad, and most other Android tablets. Rather than go down the ARM route or use a slow Atom, the N1 employs one of the latest quad-core 2.3GHz Intel Atoms.

This makes it fast: we had no problems running graphically intensive games on it. Benchmarks reveal that it isn't the fastest tablet around, however, with a 26fps result in the GFXBench T-Rex onscreen test, Geekbench 3 results of 874 in the single-core test and 2,585 in the multi-core test. This places it behind the Nexus 9 and Sony Xperia Z4.

The 5,300mAh battery will give you whole-day performance: in heavy everyday use, it happily lasted two days between charges. In testing, the N1 looped a 720p video, with the screen set to a brightness of 120cd/m², for 10hrs 23mins, which is good, if not the best.

There's 32GB of storage as standard, but not all of that is available for use: I had just under 24GB of space available without installing anything. There's also no microSD slot, so that's all the storage

you're going to get. Still, this is more than you'll get from the entry-level, and similarly priced, iPad mini 2.

Nokia has always been famous for its quality cameras, but the N1's rear 8-megapixel sensor isn't very good. It's adequate outdoors, but indoor pictures are grainy even in decent light.

The good news on the software side is that Nokia has wisely kept the N1 very close to stock Android 5.0.2. There's no bloatware or attempts to "improve" Google's own apps, meaning it's a pleasure to use. The big feature Nokia has added is the Z Launcher homescreen. Although this looks very much like stock Android, there's a significant difference: you can use your finger to write a letter, and it displays apps, bookmarks and contacts beginning with that letter.

At first, I thought this was a gimmick. However, it grew on me and I came to find it a speedy, intuitive way of getting around. Want to access your settings? Simply scrawl "s" followed by "e". The recognition engine isn't perfect, and I found that it would get confused if I quickly followed one letter with another, but it worked reliably with a little practice.

Overall, the Nokia N1 is an excellent Android tablet. The design, performance and battery life inspire a fresh look at the whole Android tablet category. If other manufacturers want to compete with Apple, they should look at the N1 as an example of how to do so.

That just leaves the question of whether you should buy one – and this is where things get complex. If Nokia were officially distributing it, we wouldn't hesitate to answer with a resounding "yes". Our review sample was supplied to us by a Chinese company called Colourful Tech, but is currently on trading hiatus to sort out a dispute with Nokia. Meanwhile, you can pick one up on eBay or via other grey importers, which aren't difficult to find using a Google shopping search.

But this isn't without risks, making the N1 difficult to recommend. If Nokia finally brings the N1 officially to Australia it will have a real hit on its hands.

Ian Betteridge

BATTERY LIFE



Video playback
10hrs 23min

KEY SPECS

Approx \$300 .
Quad-core 2.3GHz Intel Atom Z3580 • 2GB RAM • 32GB storage (24.3GB available) • 7.9in, 2,048 x 1,536 display • 8MP/5MP rear/front cameras • 802.11ac Wi-Fi • Android 5.0.2 • 139 x 9.6mm x 201 (WDH) • 318g

OVERALL



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Motorola Moto G

MOTOROLA DOES IT AGAIN: THE THIRD-GENERATION MOTO G IS PACKED WITH TOP-RATE FEATURES AT A BARGAIN PRICE

Admit it: you pay too much for your smartphone contract. What is it? \$80 per month? Over two years you could pay nigh on \$2,000 for the privilege of owning a high-end smartphone. The third-generation Motorola Moto G costs around \$280 SIM-free, and it may well be all the smartphone you need.

The first Moto G was a revelation in 2013, and this third-generation model sticks to the fundamentals: it's cheap, robust and well made. That's not to say there haven't been improvements. The curvy design is more enticing than before, with hints of the Nexus 6, and the rear shell is now textured for grip. A contrasting strip encircles the camera, flash and the Motorola logo.

There are two colours to choose from at this stage – white with a silver frame, or black with a black frame – and the rear shell is available in lime green, black, navy blue, wine red, yellow, blue, turquoise, red or white.

The phone's accident-proofing has been beefed up too: a couple of rubber seals on the underside of the shell surrounding the SIM and microSD slots help the phone

achieve an IPX7 rating. That means it can be immersed in up to a metre of water for up to 30 minutes, making it possible to shoot underwater photos and videos.

The processor has been upgraded too, from the Qualcomm Snapdragon 400 to a newer quad-core chip, the 1.4GHz Snapdragon 410 – as in the recent Moto E. The standard 8GB model has 1GB of RAM, while the 16GB version gets 2GB.

What does that mean for performance? The 2GB model I tested completed the SunSpider benchmark in an average of 1,331ms, while in Geekbench 3 its single- and multi-core scores were 529 and 1,576. These are up 32%, 54% and 36% respectively over the 4G Moto G 2.

Gaming doesn't benefit: the Adreno 306 GPU averaged only 10fps in the GFXBench T-Rex HD test at native resolution and 4fps in the Manhattan test; the Moto G 2 with 4G achieved 11fps and 4fps. Still, while it's not for the latest games, it flies with everyday tasks, feeling much more responsive than its predecessor.

The display is still a 5in, 720 x 1,280 IPS screen, with scratch- and shatter-resistant Gorilla Glass 3, and image quality can't be faulted: brightness hits 408cd/m²,

the measured contrast ratio is 1,134:1, and everything looks bright and punchy. A polarising layer helps minimise the sun's glare too.

Battery life is fine, if not outstanding. The Moto G's 2,470mAh battery reliably got through the day with capacity to spare: streaming audio over 4G with the screen off depleted battery life at a rate of 4.5% per hour, and our video test ran it down at 7.4% per hour.

At last 4G is standard, but the Moto G still lacks dual-band Wi-Fi – an almost criminal omission in 2015. And while you can expand storage via microSD, only cards up to 32GB in size can be used.

Another major upgrade is the camera, which is inherited from the Nexus 6. Although the Moto G lacks optical image stabilisation, it's a huge step forward from the old 8-megapixel camera, producing crisp and colourful images. It's much faster too: tap the screen and there's no longer a momentary lag while the shutter catches up.

As for audio, the front-facing stereo speakers remain excellent – ideal if you use your phone as a satnav in a car without a Bluetooth-enabled stereo system – and I had no issues with call quality during testing.

The Moto G's Android front-end is unencumbered by fussy launchers, and what Motorola has added works well. The new "double-chop" gesture, used to switch on the torch, is sheer genius, and the phone inherits the excellent Moto Display feature from the Moto X too, which shows notifications in circular bubbles on the standby screen.

In all, Motorola has nailed it once again with the third-generation Moto G. Its upgraded internals make it more responsive, and the software makes it feel more like a flagship than a sub-\$300 mobile device.

Before you upgrade your phone, regardless of whether it is a budget, mid-range or premium device, you really should consider the Motorola Moto G. It's the best budget smartphone on the market, and well worth the asking price.

Jonathan Bray

KEY SPECS

\$280 • www.motorola.com
Quad-core 1.4GHz Qualcomm Snapdragon 410 SoC • 1GB/2GB RAM • 8GB/16GB storage • microSD slot (up to 32GB) • 5in, 720 x 1,280 IPS display • 13MP/5MP rear/front cameras • single-band 802.11n Wi-Fi • 4G • 2,470mAh Li-ion battery • Android 5.1.1 (Lollipop) • 1yr RTB warranty • 72 x 12 x 142mm (WDH) • 154g

OVERALL



LibreOffice 5

IT'S FREE! IT'S OPEN! BUT DOES LIBREOFFICE DELIVER ON ITS PROMISE OF A POWERFUL OFFICE SUITE FOR NORMAL USERS?

How much should you really pay for a full suite of office applications? The nightmare scenario for Microsoft is that the answer is "nothing", and LibreOffice is one of the products intent on making that bad dream a reality.

LibreOffice is a completely free, open-source office suite that includes word-processor, spreadsheet and presentation software. It's derived from the old OpenOffice codebase, but has improved upon it and its successor products. And, as you'd expect from an open-source product, it's available on a range of platforms: Windows, Linux, OS X and (of course) anything you can get the source code to compile yourself.

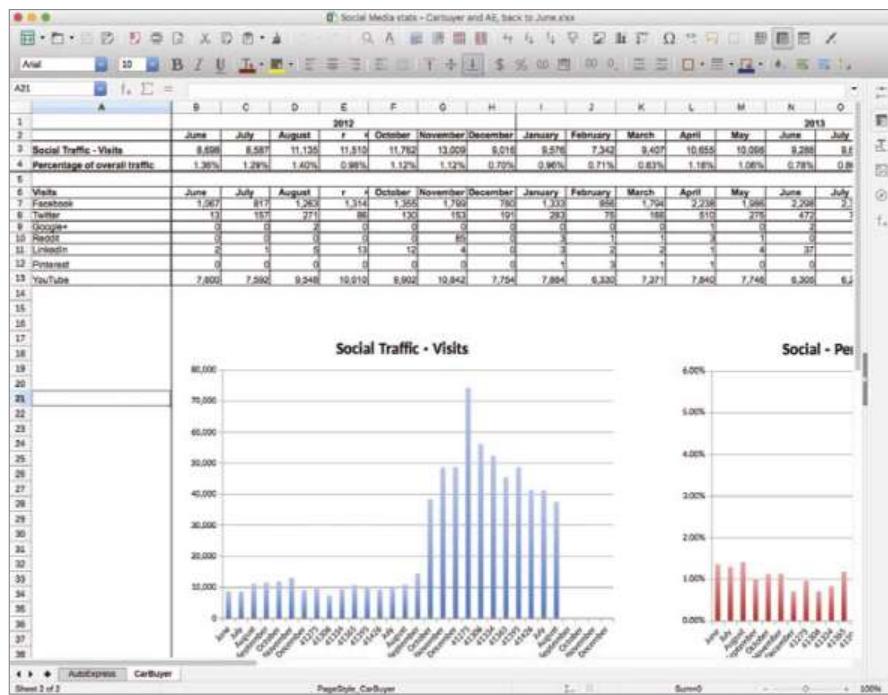
That doesn't include either Android or iOS, although an Android viewer lets you see documents and a full version is apparently "coming soon". This is the first problem with LibreOffice: now that a lot of work happens on tablets and smartphones, the lack of a full version on those platforms seems antiquated. When Microsoft is creating versions of Office for both Android and iOS, having an office suite that isn't available on mobile devices is a major hindrance.

DESIGN AND CORE FEATURES

The overall look and feel of LibreOffice is also dated. Although it has been improved from older versions of OpenOffice, which really looked like they had been designed in 1998, it still doesn't match the design work and attention to detail that has gone into Microsoft's suite. It's best described as functional, rather than pretty. You might argue that an office suite doesn't need to look attractive, but for many people, using something that looks and feels dated does matter. Even the icon on OS X – a dull grey document with one corner turned over – looks uninviting.

It is, to its credit, a clean-looking interface, and one that will be familiar to anyone who used Microsoft Office ten years ago. Whether you prefer a modern look or something traditional will determine whether you like the interface design of LibreOffice.

LibreOffice eschews Microsoft's ribbon bar – with multiple tabs hiding every single feature – in favour of the older model of multiple toolbars that you can show or hide as you please. Yes, this



means you could potentially have 25 toolbars open and virtually none of them visible, but at least you can customise which tools are visible without having to flip between tabs on a ribbon.

That's ideal for people who have a specialised role in document creation and really want a subset of tools that are always available. If you're an editor, for example, having the review tools onscreen is important.

One core feature that isn't included in LibreOffice is live document collaboration of the kind built into both Google Docs and the online version of Microsoft Office (and is being brought gradually into Office 16 for Windows). You can't have several people working on a document at the same time, meaning you have to shuffle files around using email or shared drives (such as Dropbox) instead. How important this is to you will depend on the kind of work you do, but it certainly feels like an omission for an office suite in the second decade of the 21st century.

WRITER

There are two major trends in tools for writing: simplified applications that provide minimal distraction and let you focus on the words; and complex beasts that have tools for pretty much any kind of document creation. Writer definitely falls into the latter category.

If you've used Microsoft Word over the past 20 years, there's nothing radically different here. It's comprehensive, with tools for optimising layout, creating indexes, footnotes and much more. If you have any specialised needs for document

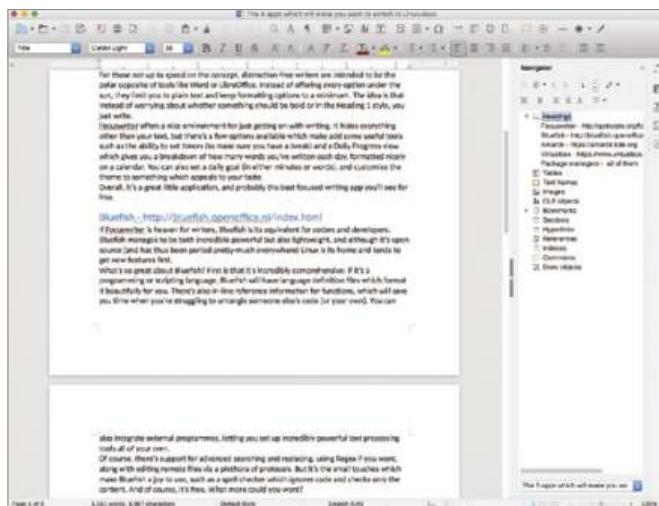
"The lack of cloud support means there are no collaboration features of the kind you'll find in Google Drive or Microsoft Office"

creation, whether as a business or academic user, Writer has you covered. Thanks to features such as styles, the navigation palette and anchors, it's particularly well suited to creating long documents – something that free competitors such as Google Docs seem to struggle with.

Interoperability with Microsoft Word is an important feature for most users nowadays, and Writer also delivers in this respect. Version 5 includes additional compatibility features, in particular the ability to preserve and correctly represent text highlighting in Word documents. You can even specify whether you would rather export your character backgrounds as highlighting or shading when saving as Word files.

Some of Writer's longest-standing bugs have finally been fixed. Page numbers no longer become random in draft mode, and you can now, at last, create paragraphs that contain more than 65,000 characters. This last one probably won't bother many, but for those it did affect (largely in the legal profession) it was a showstopper.

One of our biggest bugbears with



Writer previously was the way it handled inserting images into documents. Many don't provide tools to crop an image, or if they do, you have to enter numeric values to crop – hardly the most user-friendly process. In version 5, Writer gets this right by allowing you to crop using the mouse. This sounds like a small feature, but it's a real time-saver.

Overall, Writer is a powerful word processor that costs nothing and can do almost everything Microsoft Word can. Yes, it's not as pretty – although as we note above, the old-fashioned look has its advantages – but if you want a word processor that can handle long, complex documents and you don't want to tie yourself to Microsoft, it's a good choice.

CALC AND IMPRESS

It's a mark of Calc's maturity that it happily opened every Excel document we threw at it, including some with complex pivot tables, conditional formatting and graphs – all without losing any formatting or data. That's impressive. Not so long ago, it (and every other non-Microsoft option) would have choked on the same documents.

If you're familiar with Excel, you'll be up to speed with Calc very quickly. All the power you'd expect is there, and of course, the complexity too.

One disappointing area, and one that's

hard to see LibreOffice improving on in the near future, is macros. Calc's macros are basically incompatible with VBA, so if you have any existing macros you'll need to rework them. The good news is that the macro language built into Calc is very capable, so there's little you can't do with it. However, if you're a person who has spent years creating Excel macros, you'll have to relearn plenty to make the switch.

Impress, the presentation software bundled with LibreOffice, is the least complete of the main packages (perhaps open-source coders don't do many presentations). When importing some complex presentations with background graphics, it missed things out, so those who have a lot of existing PowerPoint files will probably want to keep a copy of Office to hand.

However, it's perfectly adequate for creating new presentations. All the tools you need are here, including templates. That said, one minor irritation is that you can't add comments to slide notes, which means that if you're a team preparing a presentation that relies a lot on the notes, taking in comments or suggested amendments from your colleagues is certainly tricky.

VERDICT

From a reviewer's point of view, open-source software is always the hardest to

rate. It always feels vaguely churlish to give a bad review to a piece of software that unpaid volunteers have spent their free time slaving over. However, on the other hand, and especially with a piece of mission-critical software such as an office suite, you need to compare it with paid-for (and sometimes expensive) products.

With this in mind, LibreOffice gets a middling rating overall. Despite its updates it still looks and feels old-fashioned – although that has its positives as well as negatives, particularly if you're familiar with older versions of Microsoft Office. The lack of a cloud services supporting it also means there are no collaboration features of the kind you'll find in Google Drive and that are being built into Office. Whether that matters to you depends on what kind of user you are.

Leaving aside the more underpowered elements of LibreOffice – such as Impress – what you have is a powerful office suite that can meet the needs of demanding users, but only if they work alone or don't mind passing documents backwards and forwards using drive services such as Dropbox. Modern business users, for whom live collaboration is increasingly important, will have to weigh up the positives and negatives carefully before abandoning Office.

However, if you need powerful features in a spreadsheet or word processor, don't work collaboratively and are on a very tight budget, LibreOffice will meet your needs very well. It's certainly worth a try for free, you just might find there's no going back.

Ian Betteridge

KEY SPECS

FREE • www.libreoffice.org

OVERALL



GET IT NOW!

LibreOffice
 The Document Foundation

FREE
Moved by Freedom
Powered by Standards

5

Labs Apps

Todoist 10

FREE · Android and iOS

There are a million and one task-management apps with varying degrees of complexity, but few offer the same power and range of platforms as Todoist. At its simplest level, Todoist allows you to break down projects into lists of tasks. Projects can have subprojects, letting you group different categories (such as home or work projects) together, and tasks can have labels – allowing you to group together all of your phone calls or emails in one place.

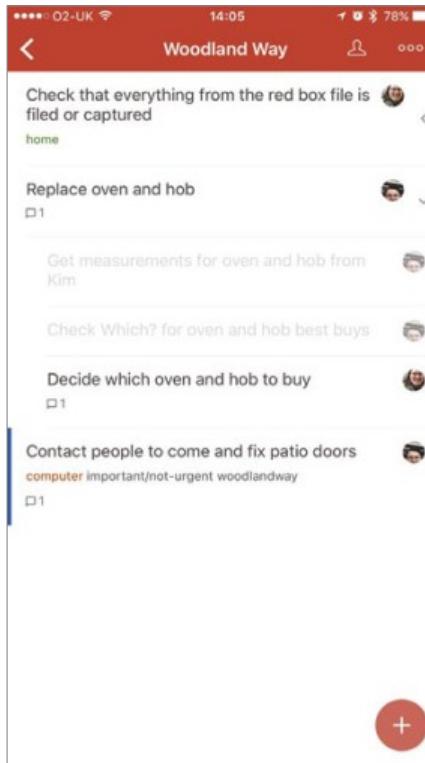
"You can filter tasks by a wide range of criteria, including who is assigned to a shared task, when it's due or its associated project"

The design of Todoist on both Android and iOS is simple and elegant. It's easy to get to grips with quickly, and includes the ability to share projects with other users. You can then delegate tasks within the shared projects to other people, making it ideal for teams or families.

Todoist has two levels of service: free and premium. Premium costs \$36.99 per year, but adds a slew of features that anyone who is serious about managing tasks is likely to want. They include reminders of upcoming tasks, either by mobile, email or SMS, as well as location-based notifications on Android and iOS. Tasks can have notes and even documents attached to them, which is particularly useful if you're dealing with a shared task list.

Premium also adds custom filters, which are a dream for power users. You can filter tasks by a wide range of criteria, including who is assigned to a shared task, when it's due or its associated project. Importantly, you can chain all of these together to create – for example – a filter that shows all of your assigned tasks due in your work projects over the coming week.

The drawback with filters is that they're not exactly plain English. For



▲ The design of Todoist on both Android and iOS is simple and elegant

example, let's say I create tags called "@life" and "@work" to keep my personal and work projects separate. If I want to see all work tasks assigned to me, the filter I need is "!:to_others: & !@life". It's certainly a powerful feature, but compared to something like OmniFocus' Perspectives, which perform a similar function, it's pretty hard to use.

Then again, OmniFocus is only available on iOS and Mac, while Todoist works on pretty much any platform – either via a dedicated app or web browser. Todoist also lets you share to-do lists, and there's even a business account option for teams.

Overall, Todoist is a close-to-perfect product for managing tasks across a wide range of platforms, especially if you want to share them. Whether you're a family looking to divide household chores or a business wanting to delegate in your team, Todoist is a great choice.

Ian Betteridge

OVERALL



Google Play Books

FREE · Android

Like to use your Android device to read? While there are plenty of ebook apps out there, Google's own Play Books is fantastic.

Usually coming preinstalled on vanilla Android devices, Google's ebook reader packs in features other free apps lack. The capability may not be initially apparent, but you can upload your own ebooks and PDF files to Play Books and access them on any Android device associated with your login, with your progress being synced across devices. This means you can read on your tablet when at home, then later pick up your phone and carry on reading when out and about. That's not a bad function for a free app.

Vaughn Highfield

OVERALL



You Must Build a Boat

\$3.79 · Android



At first, You Must Build a Boat looks like a regular puzzle game, in which you slide blocks around to match symbols. But you quickly realise there's much more to this addictive, fast-paced, side-scrolling RPG.

Your task is simple: you must build a boat. To obtain the necessary parts, and assemble a crew, you'll find yourself raiding caves, tombs, bunkers and Japanese pagodas. You'll also meet monsters, and fight them by mastering the sliding-block puzzle mode, matching sword or staff tiles to attack and defend. You can also build strength and intelligence to improve your character and recruit new shipmates. You Must Build a Boat is fantastic fun.

Vaughn Highfield

OVERALL



Glitché

\$1.29 · iOS

What used to happen for free with VHS players is now the subject of an app that lets you turn photos into glitchy works of art. For less than a quid you get a sizeable range of tools, from databending to turning pictures into a grid of emoji. There's definitely a book waiting to be written about the popularity of the glitch as an aesthetic – the purposeful created from the accidental – but it's probably best not to think too hard and just enjoy making freaky photos.

There are more than enough tools included in the base version to impress and terrify your followers, but you'll need pay \$1.29 for the Pro version's hi-res exports.

Thomas McMullan

OVERALL



Steve Reich's Clapping Music

FREE · iOS

An avant-garde American composer may not be the most obvious starting point for an addictive rhythm game, but developer Touchpress has managed to create a fun app based on a 1972 Reich composition performed entirely by clapping.

The aim here is to tap the screen in rhythm, which starts hard and ramps up further in difficulty when the claps abruptly change pattern. You'll most likely give up in sheer frustration every couple of minutes – think Flappy Bird (or Clappy Bird) – but the minimalist design and information about Reich's music will keep you coming back for more.

Thomas McMullan

OVERALL



Pocket6

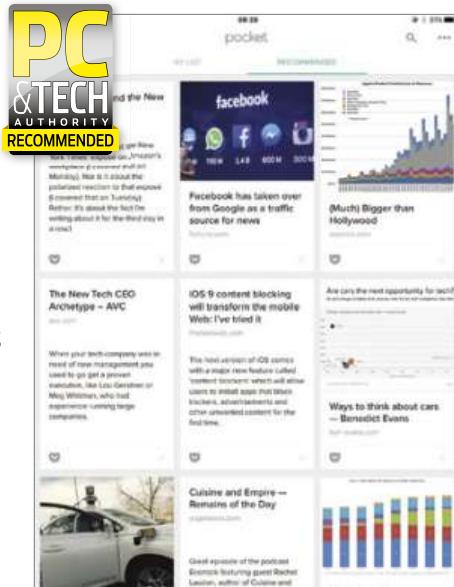
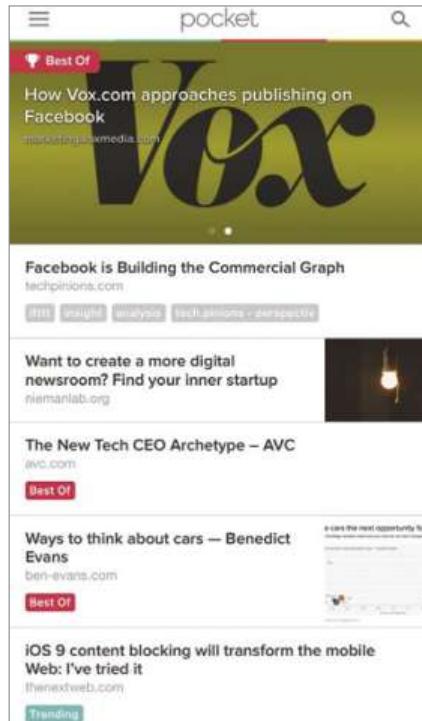
FREE · Android and iOS

Pocket has long been one of the leading applications for saving web pages for reading later. You can clip articles to it using a browser extension or bookmarklet, or use one of the many integrations with other applications (such as feed readers) to get content in. Pages are saved to your mobile device and stripped of formatting and ads, making them much easier to read. This happens in the background, so you don't need to worry about having to open the application and download the articles.

Once the pages are saved, you can share links to them, mark them as favourites, add tags for easier navigation and even play back the article using text-to-speech. However, you'll often just be reading them, and as a method of putting together a reading list for those ideal moments when you have time, Pocket is a great application.

The biggest improvement in version 6 is the addition of suggestions through a new "Recommended" tab. Recommendations are based on the most popular articles saved to Pocket, tailored to topics and sites you've saved in the past. You can add the recommendations to your main reading list with a single tap.

▼ Articles are stripped of formatting and ads, making them easier to read



▲ Suggestions are based on popular articles and can be tailored to you

For me, this worked well enough to recommend articles I would be interested in but, unfortunately, it also meant that I'd already read many of them outside Pocket. The suggestions also lacked a bit of the surprise factor that should be built into every recommendation engine. Most of what I normally save to Pocket is about technology, so Pocket recommended lots of technology articles to me. It could have done with a sprinkle of other stuff to surprise me a bit.

In Instapaper, Pocket's main competitor, also has a recommendations system, but, instead of being based solely on an algorithm, it also uses links shared by the people you follow on Twitter. This gives it more of a curated flavour and we found its recommendations to be better overall than Pocket's. Having said that, we'd expect Pocket to tweak its recommendation engine and improve things over time.

Pocket has two tiers of pricing, free and Premium. Premium, which costs \$56.99 per year, gives you a permanent library of all the content you save, full-text search of all your articles, and suggested tags for each article. Is it worth it? For the hardcore user who piles stuff into Pocket constantly and uses it as an archive of content, probably. However, if all you want to do is to read web pages saved offline, then the free version will be more than enough.

Ian Betteridge

OVERALL



Microsoft Office Sway

\$FREE · iOS

You can tell that Microsoft is serious about Satya Nadella's new "Microsoft software everywhere" approach from the number of new applications it's releasing for iOS and Android. Office Sway is a good example.

But what exactly is it? Initially released as a web application, Sway is a tool for telling stories using photos, links, text, embedded tweets and video. You could think of it as a reimagining of PowerPoint for people who don't like conventional presentations. Imagine a 21st-century "what I did on my holidays" slideshow and you're getting close to Sway.

Because Sways are hosted on Microsoft's servers, you need a Microsoft account to use the app. It's incredibly easy to get to grips with: you insert media and drag it around, then Sway will format it according to a set of simple but attractive templates. There's a limited amount of control over these, so forget about turning all your corporate presentations into funky-looking Sways.

Once you're happy with what you've done, you can send a link to the resulting Sway to whoever you want to see it, so they can view it on the web. Sway is designed to be cross-platform, and it was viewable on all the browsers we tested.

▼ Think of Sway as a 21st-century tool for showcasing your holiday snaps



Highlights of the Surface Pro 3 launch

Barry Gilbert @BSGilbert

Sony may launch a 12-inch Xperia tablet to take on the Surface Pro 3 and Samsung's Galaxy... goo.gl/fbzYhno

2:10 PM · 27 Oct 2014

Design



The app is quite limited compared to the web version. The content types you can work with are limited to text and images – you can't insert video, tweets or charts, all of which are available in the browser. It feels as though the app is intended for quick edits, fast creation of new Sways in outline or simply starting off a Sway when you're on the go. For example, you could start a Sway while on a trip in order to keep friends and family up to date while you're away. Then, when you return, you could polish your Sway with additional media to turn it into something you'll want to look back on again in the future.

At the moment, Sway is a promising but slightly flawed product. The app is too limited to do much with, beyond setting out the structure of a Sway that you can finish at home or in the office. I think there should also be a little bit more guidance about what the product is for and what it can do: perhaps a showcase of brilliant Sways created by users and curated by Microsoft would help.

However, at the same time, it's promising: you can easily see kids, in particular, using Sway to create projects for the classroom that really bring to life their work in a way PowerPoint never could. It's definitely one app worth keeping an eye on.

Ian Betteridge

OVERALL

Unclouded

FREE with in-app purchases · Android

Juggling multiple online storage accounts can be a headache; Unclouded is here to help. Pulling all your connected accounts into one uncluttered interface, the app lets you access your files from a single location, no matter where they're stored. Unclouded currently supports Dropbox, Google Drive, OneDrive, Box and Mega, so it's really only iCloud users who are left out.

If you only need to manage one or two accounts, it's free to use, but if you want to aggregate more content you'll need to pay. Thankfully, Unclouded lets you pick and choose which services you'd like, so you'll never pay for something you don't use.

Vaughn Highfield

OVERALL

▼ Unclouded lets you manage all your cloud services in one place



PC
& TECH
AUTHORITY
RECOMMENDED

Greenify

FREE · Android

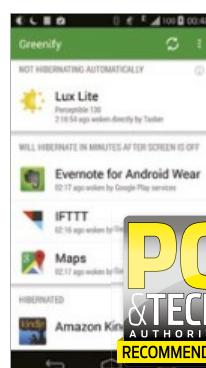
Android has its own set of battery-saving tools, and many phones now offer power-saving modes, but these kick in as a last resort. Greenify, on the other hand, helps to prevent your phone's battery from running down in the first place.

It does this by regulating how much battery power various apps are using. It freezes selected apps when you're not using them, and instantly and automatically defrosts them when you need to gain access.

Earlier versions of the app required root access, but this is no longer the case, so it's perfect if you're looking to save power on any Android device.

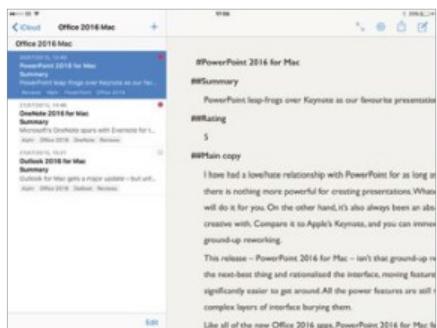
Vaughn Highfield

OVERALL



PC
& TECH
AUTHORITY
RECOMMENDED

▲ Greenify freezes apps that you're not using to boost battery life



Ulysses

\$56.99 · iOS

Ulysses is a powerful writing app that has recently made the transition from Mac. It's designed for anyone who writes regularly but wants to maintain the portability of the iPad.

Described by its creators as "desktop-class writing for iPad", the app offers a productive, minimalist design alongside all the essential word-processing functions. A three-panned sidebar lets you see all your files at a glance, and you can export your files as PDFs or Word documents. In addition, you can share them directly via Dropbox.

It's priced at \$57, which may seem a little expensive, but it's worth it.

Ian betteridge

OVERALL



MindNode

\$12.99 · iOS

MindNode is an intuitive brainstorming app that can help organise your mental clutter. Using a variety of colours and line widths, you can create a map of interconnected thoughts, or use the app to place your ideas into different categories.

Mind-mapping doesn't work for everyone – a more freeform tool such as OneNote may work better for ad hoc notes and ideas. But MindNode offers an exceptionally clear interface and Apple Watch integration – allowing you to browse your notes and images on the go – making it one of the most complete brainstorming apps out there.

Thomas McMullan

OVERALL



Dashline

FREE · Android and iOS

Password managers sometimes get a bad name. Many people are nervous of storing their passwords on a server somewhere, seeing this as a single point of failure – something that the recent security breach of LastPass will have done little to assuage. And while they allow you to conveniently synchronise your passwords for websites across different devices, if you're using a modern browser, that's taken care of.

But there are still good reasons to use a password manager. Dashlane – recently updated on iOS but also available on Android, Windows and OS X – does a lot more than let you synchronise your passwords across different devices. Like most password managers, it also lets you generate and automatically store complex passwords, the kind that make brute-force hacking of your accounts much more difficult. Using a password composed of a random string of upper- and lower-case letters, with a few extra characters thrown in, is intrinsically more secure than a couple of words, even if you change the "E" to "3".

Dashlane goes a lot further than this. It can audit all your passwords and rate how secure they are, giving you a score for each one. If you use the same password across different sites, it will warn you and tell you how many other

✓ The password generator allows you to create and store complex logins

The screenshot shows the Dashlane Password Generator interface. At the top, it displays the generated password "sf0VdKtrNDrZsyJ" with a strength indicator of "Strength: 100%". Below this, there are sliders for "Length" (set to 40), "Digits" (set to 1), "Letters" (set to 1), "Symbols" (set to 0), and "Pronounceable" (set to 0). At the bottom, there are status indicators: "No device synced" (red X) and "Backup: On" (green checkmark).

The screenshot shows the Dashlane mobile application interface. It features a header with "Link Dashlane with SwiftKey" and "Get Dashlane on your computer". Below this is a "Recent Changes" section showing updates for "google.com" and "twitter.com". At the bottom right is a "PC & TECH AUTHORITY RECOMMENDED" badge. At the very bottom, there are sync status indicators: "No device synced" (red X) and "Backup: On" (green checkmark).

▲ Dashlane can automatically update your passwords with a single click

sites you're using the same credentials on. In my case, for example, it found the same password used across more than 20 sites; should one of them have been breached, it would have been a potential issue for all those sites.

Even better than this is the fact Dashlane can automatically update your passwords without you having to go to the site. If it finds an insecure password, you can change it by clicking a single button, which makes it easy to keep things secure. This doesn't work with every site, but most of the major services (and quite a few of the minor ones) are covered.

The latest release also adds a feature that will make the security-conscious user very happy: instant security alerts. If a site with which you have an account is compromised, Dashlane will quickly alert you via your mobile device and give you the option of changing your password with a single click. If you have an Apple Watch, the alert will appear on the Watch too: simply tap once to change your password in seconds (assuming, of course, that the service in question is supported).

It's human nature to be lazy and reuse passwords. The benefits of using Dashlane, therefore, are likely to far outweigh any potential issues, and an application that nudges us towards better security is surely worthwhile.

Ian Betteridge

OVERALL



Labs Briefs

Parallels Desktop 11 for Mac (Pro Edition)

\$124.95 (1-year subscription) · www.parallels.com/au

Parallels has expanded its virtualisation software offering to include a Pro edition of Desktop for Mac, which provides more tools for developers and testers to work with. For the extra outlay over the Standard edition (both of which are El Capitan ready), you get access to the Microsoft Visual Studio plug-in, and support for various dev tools, such as Docker, Vagrant, Jenkins, and Chef.

You also have the ability to allocate 64GB vRAM and 16 vCPUs, compared to 8GB vRAM and 4 vCPUs in the standard version, and access to advanced networking tools.

As with version 10, you can install Windows from a DVD or an ISO, or migrate an installation from a different PC. You can also download trial versions of multiple Windows versions (as IE test environments), or fully functional versions of ChromeOS, Ubuntu and Android OS. All up, a good upgrade to what was already a highly capable piece of software.

Peter Gutierrez

OVERALL



Sony Xperia M4 Aqua

\$399 · www.sonymobile.com/au

Sony has created a mid-range phone with a premium feel, in the Xperia M4 Aqua. The M4 Aqua's glass backing and metal edging certainly give the appearance of a more expensive handset. It's only when you start digging into the specs that it's at this price point for a reason.

Running Android 5.0 Lollipop, it has a 5in screen and only a 720p resolution, but isn't blurry by any stretch. Inside is an energy-efficient Snapdragon 615 processor, which helps the M4 Aqua meet its claims of a 2-day battery life (with moderate use). Its 8GB of storage is paltry, but is expandable via Micro SD up to 128GB. Its 13MP camera also takes decent pics.

Its party piece is it's waterproof and dustproof, so you can easily use this phone in the rain or at the beach without a care in the world.

All in all, not a bad handset for the budget-conscious.

Peter Gutierrez

OVERALL



Volans 4-Port USB Smart Charger

\$29 · www.volans.com.au

Volans is a new brand, and has just launched in Australia. The company has an impressively huge array of gear for a launch, and the products are popping up in dozens of online stores, so of course we were interested in having a look.

This 4-port smart charger has the same premium look and feel of the rest of Volans' gear, the design is classy, and minimalist. It feels well made. Its party trick is the 'smart' voltage regulator. It detects the required voltage for a device and delivers the maximum possible charge, up to 2.4V per port or device. If you are charging multiple devices it portions out the available voltage, to a limit of 6V overall for the charger.

There are other configurations available from Volans. Over two weeks we've all been using this one in the office to charge our phones, it does exactly what it says on the box and doesn't look cheap and nasty like many others, so, we like it.

Ben Mansill

OVERALL



Turtle Beach Grip 300

\$54 · www.turtlebeach.com

This 'kit' is sold as a mouse and mouse pad combo, and it's pitched as a gaming product. But after using the mouse at home for a couple of weeks it's clear that this is simply a very good mouse, whether for gaming or regular use, with what I'd call a 'bonus' mouse mat that may or may not bring you happiness, depending on what product you're currently using.

The mouse is small and slim, but even with my big hands it's instantly natural to feel at home with. As is the current fashion, the surface is that semi-rubbery material popping up on everything. It's terrific, I love it. Despite the mouse not having particularly ergonomic indentations it still holds firm.

As for the mouse pad, well it's passable. The soft fabric is decent enough, but here and now it's the mouse we're recommending, and strongly.

Ben Mansill

OVERALL



Mionix Castor

\$110 · www.Mionix.net

The Mionix Castor is a triumph of design. Rather than opting for all the bells and whistles common to many modern mice, Mionix instead focussed on comfort and accuracy with the Castor, making it one of the most comfortable mice we've seen in a long time. The ergonomics are designed to support the three most common grips for mousing – finger, palm and claw – ensuring that it fits comfortably in your hand no matter how you hold a mouse. The six buttons – left, right, two thumb buttons, scroll wheel and DPI switcher and nice and clicky and well placed for easy access. The PNW-3310 10,000 DPI sensor the Castor sports is extremely accurate and the lack of any hardware acceleration means that movements are smooth and reflective of input rather than twitchy.

Aside from the ability to set the colours of the logo to anything on the RGB spectrum, the Castor eschews fluff and is all the better for it.

Daniel Wilks

OVERALL



Volans 10 Port USB 3.0 Hub

\$79 · www.volans.com.au

Ten ports for a single USB 3.0 hub is something you either need, or don't. But we are finding already that the number of back panel ports most 100-series motherboards come with as standard is disappointingly low. There just aren't enough on most boards, in our opinion. As a result anyone who builds a new 100-series PC has limited options for a solution.

This option is from new brand Volans. It's priced fair and square in the middle of the market, though does look nicer than most. Worth noting is its built-in surge protector. I've personally had USB hubs die on me in the past, including from big brand names.

We've been using this around the office for a few weeks and it does what it says it does.

Ben Mansill

OVERALL



Lacie Rugged RAID

\$599 (4TB) · www.lacie.com

It's hard to imagine wanting more from a portable drive, if toughness is an important part of your criteria. Lacie has been making ruggedized drives for a very long time, and the rubber-like material padding it is reassuringly thick. We did a 2m drop test and the data survived, which is notable as it's only rated to 1.5m. The connector end is sealed by a relatively massive plug, and Lacie claim it to be dust and water-resistant to IP 54 standards, which means water splashes. As a result the drive is quite large, and because it has two physical drives, is slightly heavier than the slim drives you may have seen.

What's most interesting is the initial configuration option of running in RAID 1 or RAID 0. We wish more dual-drive portable devices (of which there are few) offered such flexibility. The software that enables this is mostly graphical, with a slider bar for formatting partitions. Lovely. And, it's USB 3 and Thunderbolt. What's not to love?

Ben Mansill

OVERALL



WD Blue SSHD

\$249 · www.wd.com.au

Two new hybrid drives landed on our desk ('thud'), this week. One, a 4TB 3.5inch, as well as a 2.5inch 1TB model. 'Blue' denotes WD's hybrid range, which is an interesting category, as it gives you far higher capacity than you would see at this price point for a pure SSD. There hasn't been a huge amount of activity in this area. Seagate have models, and WD made a splash with its consumer Black 2 two years ago.

Each drive has 8GB of NAND flash onboard, on it are automatically placed the most used files in whatever operation you are conducting, with a smart algorithm on the drive to keep tabs. This algorithm boasts smart learning. The benefit is generally snappier performance, as well as better boot times. The 2.5inch model benched at 111MB/s read and 83MB/s write, while the larger 4TB 3.5inch model came in at 148MB/s read and 135MB/s write. In real world use expect a 20–30% improvement over a mechanical-only hard drive.

Ben Mansill

OVERALL



Get Smart

WHICH OF THE MANY SMARTWATCHES OR FITNESS BANDS SHOULD ADORN YOUR WRIST? WE TEST TEN OF THE LATEST MODELS TO HELP YOU DECIDE



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You probably don't need a smartwatch. Even the cheapest smartphone will keep you on top of your inbox and your diary, give you voice search and navigation, and buzz with a stream of notifications. It will even give you the time. There's a strong argument that a smartwatch is a \$100-\$350 device that's sole purpose is to save you the bother of pulling your smartphone from your pocket.

All the same, you probably want a smartwatch anyway. What's more, there's a good chance that you'll find one really useful and wonder how you ever lived without it.

Set it up correctly, and there's no doubt that a smartwatch can help you stay more organised and work more effectively. Whether you're focusing on a task or just enjoying a day out, you can quickly check a smartwatch without becoming distracted. It gives you what you need at a glance.

A smartwatch is also less obtrusive than a smartphone, which is great news when you're trying to navigate through Melbourne or check the football score halfway through a family dinner. The biometric hardware and friendly software can make fitness and lifestyle tracking more accessible. Even the most hopeless salad dodger might get enough encouragement to turn things around. What's more, we're still in the early days. Who knows what future apps and OS updates will bring?

TYPES OF SMARTWATCH

The smartwatch market has two ancestors. On one side, we have the dedicated smartwatches, with origins in the world of smartphones and apps. In the other, we have fitness watches, with their roots in exercise-tracking technology. Over the past 18 months, we've seen smartwatches taking on more fitness functionality, while the fitness watches have adopted smartwatch features, but there's still a distinction between the two. Then again, we also now have hybrid devices such as the Microsoft Band and Acer Liquid Leap.

Devices at the fitness end of the spectrum are designed to be robust and practical rather than attractive, while those at the smartwatch end put looks and screen size first. Technology doesn't get any more personal than a smartwatch, so you really need to make sure that the device will fit your lifestyle, tastes and, in some cases, physique. A Motorola Moto 360 that looks good on those with beefy forearms might look huge on a skinny wrist, while the retro charms of the Pebble Time may

not sit well with your smart suits and polished brogues.

There are also big disparities in screen technology. Fitness watches gravitate towards transreflective LCD screens that are visible in bright sunlight and don't consume much power, boosting battery life at the expense of presentation. AMOLED and OLED screens offer rich colours and a sharper, brighter image, but at the expense of battery life. In fact, to guarantee all-day running you may

find your smartwatch displays no screen when it's not in active use. The Pebble Time finds a balance between the two by offering colour on a low-power, e-paper screen. What's more, it still works brilliantly in sunlight.

Screen shapes and sizes vary enormously, with the Acer Liquid Leap and Microsoft Band opting for narrow strips, while the Moto 360 and LG Watch Urbane go for a traditional round face. Strips are fine for fitness bands, but offer

less space for smartwatch features such as navigation or notifications, and while square screens are more practical for reading text, looking at your schedule and checking maps, many people simply won't consider a watch that isn't round.

PERFORMANCE

Smartwatches are companion devices, designed to work in close contact with a smartphone. As a result, CPU horsepower isn't critical. However, we're

	LABS WINNER			
	Acer Liquid Leap	Apple Watch Sport	Asus ZenWatch	Fitbit Surge
OVERALL SCORE	★★☆☆☆	★★★★★	★★★★☆	★★★☆☆
PRICING / SUPPORT				
Price	\$110	\$349	\$195	\$349
Manufacturer	acer.com.au	apple.com.au	asus.com/au	fitbit.com/au
Dimensions (WDH)	12 x 9.5 x 39mm	33 x 10.5 x 39mm	40 x 9.4 x 51mm	24 x 12 x 21mm
Weight	20g	25g (without strap)	75g	32g
Warranty	1yr RTB	1yr RTB	1yr RTB	1yr RTB
DISPLAY				
Size	0.9in (strip)	1.5in (square)	1.63in (square)	1.25in (rectangular)
Resolution / panel type	128 x 32 OLED	340 x 272 AMOLED	320 x 320 AMOLED	TFT (resolution not specified)
Glass type	6H hardened glass	Ion-X	Gorilla Glass 3	Gorilla Glass 3
KEY FEATURES				
OS	Proprietary	watchOS 1.0.1	Android Wear 5.1	Proprietary
RAM / storage	16KB / 256KB	512MB / 8GB	512MB / 4GB	Not specified
Wi-Fi / Bluetooth	✗ / 4	802.11n / 4	✗ / 4	✗ / 4
Battery capacity	Not specified	205mAh	369mAh	Not specified
Charging port	Proprietary cradle	Proprietary magnetic USB	Proprietary cradle	Proprietary
Water resistance (IP rating)	IPX7	IPX7	IP55	IP54
Compatibility	iOS 7+; Android 4.3+	iOS 8.2+	Android 4.3+	iOS 7+; Android 4.3+
SENSORS				
Heart-rate sensor	✗	PPG and infrared	Biosensor	Optical
GPS / compass	✗ / ✗	✗ / ✗	✗ / ✗	✓ / ✓
Accelerometer	✓	✓	✓	✓
Ambient-light sensor	✗	✓	✗	✓
FUNCTIONS & NOTIFICATIONS				
Message / event notifications	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✗
Call screening / voice calls	✓ / ✗	✓ / ✓	✓ / ✓	✓ / ✗
Voice controls / message dictation	✗ / ✗	✓ / ✓	✓ / ✓	✗ / ✗
Turn-by-turn navigation	✗	✓	✓	✗
Alternative watch faces	✗	✓	✓	✓
Music controls	✓	✓	✓	✓
Other	✗	Camera remote; weather	Camera remote; Google Now; health and fitness apps	Health and fitness apps; run tracking
STRAPS & ACCESSORIES				
Strap attachment method	Integral	Proprietary handlebar	22mm	Integral
Other accessories	Charging cradle	Magnetic cable; additional strap	Charging cradle	USB cable

✓ We wouldn't recommend the more expensive versions of the Apple Watch



beginning to see older models struggle with the latest version of Android Wear, and as the apps and operating systems grow more sophisticated, some models are more future-proof than others.

It's a similar story with storage and RAM. The Pebble has a fraction of the capacity and memory of the Apple Watch or LG Watch Urbane, but the lightweight OS and apps don't need more. Your smartphone will handle the grunt work.

Here, the more important factor is the feature set, and more specifically the sensors. All smartwatches employ some kind of accelerometer to track movement and count your daily steps – although some use fewer or less sophisticated sensors that don't produce accurate data. Some include a heart-rate monitor. Some have an ambient-light sensor to vary screen brightness according to conditions, while some incorporate built-in GPS.

	LABS WINNER					
Garmin Vivoactive	LG Watch Urbane	Microsoft Band	Motorola Moto 360	Pebble Time	Sony SmartWatch 3	
★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★★	★★★★★	

\$339	\$349	\$277	\$220	\$320	\$200
garmin.com/au	lg.com/au	microsoft.com	motorola.com	getpebble.com	sonymobile.com
44 x 8 x 39mm	46 x 11 x 52mm	19 x 8.7 x 50mm	47 x 11.9 x 46mm	38 x 9.5 x 41mm	36 x 10 x 51mm
38g	67g	60g	49g	43g	74g
lyr RTB	lyr RTB	lyr RTB	lyr RTB	lyr RTB	lyr RTB

1.13in (square)	1.3in (circular)	1.4in (strip)	1.56in (circular)	1.25in (square)	1.6in (square)
205 x 148 transreflective TFT	320 x 320 P-OLED	320 x 106 TFT	320 x 290 IPS	144 x 168 LTPS	320 x 320 transreflective TFT
Hardened	Gorilla Glass 3	Hardened	Gorilla Glass 3	Gorilla Glass 3	Hardened

Proprietary	Android Wear 5.1	Proprietary	Android Wear 5.1	PebbleOS 3	Android Wear 5.1
Not specified	512MB / 4GB	128KB / 64MB	512MB / 4GB	256KB / 1MB	512MB / 4GB
✗ / 4	✗ / 4.1	✗ / 4	✗ / 4	✗ / 4	802.11n / 4
Not specified	410mAh	2 x 100mAh	320mAh	150mAh	420mAh
Proprietary cradle	Proprietary cradle	Proprietary magnetic cable	Qi wireless charging	Proprietary magnetic cable	micro-USB
5ATM	IP67	IP54	IP67	N/A (30m)	IP68
iOS 8+; Android 4.3+	Android 4.3+	iOS 7.1+; Android 4.3+; Windows Phone 8.1	Android 4.3+	iOS 8+; Android 4+	Android 4.3+

✗	PPG	PPG	PPG	✗	✗
✓ / ✓	✗ / ✗	✓ / ✓	✗ / ✗	✗ / ✗	✓ / ✓
✓	✓	✓	✓	✓	✓
✗	✗	✓	✓	✗	✓

✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓
✗ / ✗	✓ / ✓	✓ / ✗	✓ / ✓	✓ / ✗	✓ / ✓
✗ / ✗	✓ / ✓	✓ / ✓	✓ / ✓	✗ / ✓	✓ / ✓
✗	✓	✗	✓	✗	✓
✓	✓	✗	✓	✓	✓
✓	✓	✓	✓	✓	✓
Health and fitness apps; run tracking	Google Now; health and fitness apps	Cortana; health and fitness apps	Google Now; health and fitness apps	✗	Google Now; health and fitness apps

24mm	22mm	Integral	22mm	22mm	Proprietary
Charging cradle	Charging cradle	Magnetic cable	Charging cradle	Magnetic cable	micro-USB cable

Those that don't can still piggyback on the location sensors in your phone, but those that do can track routes and distances even when you don't want to lug your phone around. Great for a keen runner, for example.

The other major differentiator is battery life. Some smartwatches last several days or even weeks without a recharge, while others – in practice – need charging every day. That's not as much of a pain as you might think if you build it into your routine, but there are implications for the battery's long-term longevity.

SOFTWARE

Beyond the proprietary firmware used on the fitness watches, there are four operating systems on offer. Pebble has its own OS. It's simple, easy to use and reflects the company's independent, community-led ethos, with a large selection of watch faces and apps. The Microsoft Band runs on a custom version of Windows Embedded, but is very focused and accessible, while playing surprisingly well with iOS and Android. However, customisation options are limited and third-party apps are non-existent.



“Technology doesn't get any more personal than a smartwatch, so make sure the device will fit your lifestyle”

Android Wear and Apple's watchOS are the biggest players, with Android Wear bound into the Android ecosystem and watchOS tied to iOS. While watchOS's App Store is stronger, both contain companion apps for many major apps and services.

The mistake people make when buying a smartwatch is that they expect it to do something amazing in itself, but they work best when you get them working with the systems, apps and services you already use. They're brilliant for checking your email, sending and receiving short texts, and navigation. They can help you get nearer to your fitness goals. They're also great when used with to-do list, note-taking and communications apps. We suspect that this is just the beginning, and that the killer app for smartwatches is just around the corner.

HOW WE TEST

We paired our watches with a range of iOS, Windows and Android phones, using them every day in our working lives, while bringing in activities to test their fitness-tracking, local search, communications and navigational skills. We also tested battery life using our standard tests, setting each watch up to receive regular notifications, then analysing how much charge was consumed over five or more hours to project a realistic maximum running time. Where possible we also tested the screen brightness using a colorimeter.

Sony SmartWatch 3

THE BARGAIN OF THIS MONTH'S GROUP, DELIVERING DECENT PERFORMANCE AND EXCELLENT VALUE

Sony's Android Wear smartwatch hasn't got the best styling, the strongest feature set or the sharpest, brightest screen, but it almost claws its way onto the winner's podium through value. This is a good Android smartwatch with reasonable battery life, fine performance and a decent screen for around \$200.

It's a simple design, with the core watch module available in a choice of a thick rubber straps, more lightweight sports housings and premium metal bands, all available in two colours. Our black rubber version isn't exactly glamorous, but it feels solid, comfortable and robust, with a secure folding clasp. There's just one button on the right-hand side to wake the watch up, with most other actions handled through the large 1.6in touchscreen. Given the work Google has put into making Android Wear more intuitive, that's all you need.

The screen itself has its plus and minus points. On the one hand, it's a transreflective TFT, which makes it more

usable than the Asus ZenWatch or the LG Watch Urbane in bright sunlight. Its size and the 320 x 320 resolution also make it easy to read notifications and check your location on Google Maps. On the other hand, the display looks dimmer indoors than those of other Android watches. We measured maximum brightness at 281cd/m², and that doesn't reflect the obvious blue/purple cast. It's nothing we can't live with, but if you want a screen with "zing", look elsewhere.

The same might apply if you want fitness features. The Sony has no built-in heart-rate monitoring, although it does have GPS.

Otherwise, the SmartWatch 3 works brilliantly as a vehicle for Android Wear 5.1. With a 1.2GHz ARM Cortex-A7 processor, it feels slick and snappy, and navigating through the various notifications, cards and apps is prompt. The microphone works well when dictating replies to texts and notifications, or sending queries to Google Now. Battery life isn't up to the level of the Watch



Urbane, but it's well above the ZenWatch and Moto 360. Want an affordable way to climb on the wearables bandwagon? The SmartWatch 3 is it.

KEY SPECS

\$200 • www.sonymobile.com

OVERALL



Apple Watch Sport

OTHERS TRUMP IT ON BATTERY LIFE AND VALUE, BUT APPLE OFFERS THE BEST SMARTWATCH EXPERIENCE

The Sport may be the cheapest of the many Apple Watch models, but even still it's a tough proposition on value. With the 38mm version clocking in at \$349, and the 42mm version adding \$50 to the price tag, it's around a third more expensive than most of its competitors in this test – and that's without moving up into the \$599-\$17,000 price range of the more luxurious models.

It's not a winner in other departments, either. Battery life, at around a day and a half, is a long way short of the LG Watch Urbane or even the Sony SmartWatch 3. While the Watch Sport has sophisticated heart-rate sensors, accelerometers and gyroscopes, it doesn't have onboard GPS. What's more, step count and heart-rate monitoring while running or walking is slightly off the pace logged by the Fitbit Surge and Microsoft Band, albeit only by a few beats per minute in the early stages of a run, or 65 steps over 3km.

Why, then, does the Apple Watch claim the winner's crown? For a start, hardware design. The Apple Watch Sport is by far the lightest and most comfortable watch on test. Thanks to its smoothly contoured back and Apple's aluminium alloy, the 38mm version weighs only 25g and the 42mm 30g (without the strap). The fluoroelastomer – or artificial rubber – strap is so soft against the skin that you practically forget it's there. The touchscreen is also sensational; pin-sharp with vibrant colours and ample brightness in sunshine.

Then there's the haptic feedback. Where other watches buzz away on your wrist for notifications, the Apple

Watch hits you with spookily focused taps instantly grabbing your attention. Where Android Wear watches sometimes need a jiggle to wake up, the Watch Sport is unerringly responsive. Even charging is handled well, with a small magnetic disc of Apple's USB cable clamping instantly to the back of the watch.

In most respects software is as good as you'd expect. Upward and downward flicks take you to your notifications or a series of "Glances" – one-shot views of apps that hit you with the most important information. Tapping on one opens the relevant app. A low-profile button on the right calls up a ring of icons for favourite contacts, enabling quick messaging and calling, while pressing the Digital Crown takes you to your app launcher – a cluster of tiny icons that's surprisingly precise in use. The crown itself handles vertical scrolling in apps, giving you an uninterrupted view of the screen. It's better than Android Wear in almost every respect.

Apple's built-in app selection covers all the basics, including fitness and navigation, and while specialist fitness watches offer more detailed performance tracking, the Watch Sport's friendly apps do a fantastic job of encouraging a more active lifestyle – and the more high-end apps are there if required.

The biggest thing in Apple's favour is that the Watch Sport feels like a platform in its own right, not just a companion device. While there are still plenty of times when an app will hand you over to your iPhone, there's plenty you can do on the watch itself, and the range of apps is already impressive. Prefer Google's Inbox to Apple's Mail client? Sunrise to the native Calendar? The Watch has you covered. There's



PC & TECH AUTHORITY RECOMMENDED

"The biggest thing in Apple's favour is that the Watch Sport feels like a platform in its own right"

everything from Slack and WhatsApp messaging to simple role-playing games, and Siri's speech recognition does a reasonable job with searches, reminders and short texts, even handling punctuation.

Battery life might not be up to much, but the overall experience is better than any other smartwatch we've tested. And while Apple's software has imperfections – lack of customisability is a bugbear, and you can't get Siri to transcribe emails – the forthcoming watchOS 2 looks set to iron out many of the niggles. We wouldn't recommend stumping up for the premium versions, but if you want the best smartwatch of the moment, this is it.

KEY SPECS

\$349 · www.apple.com/au

OVERALL



◀ An array of sensors can be found on the back of the Watch



LG Watch Urbane

GREAT FEATURES, PERFORMANCE AND BATTERY LIFE - THE LG WATCH URBANE IS THE BEST ANDROID SMARTWATCH

Round faces are all the rage among Android Wear manufacturers, and with the Watch Urbane it's easy to see why. It might be a little thicker and heavier than your average mid-range timepiece, but it looks like the kind of watch that people – albeit mostly men – actually buy. Not all of us like the styling or admire the finishing, but with its leather strap and the right watch face, the Watch Urbane looks sophisticated. There's no danger of forgetting that it's there, though, at 67g.

The 1.3in P-OLED screen has a 320 x

"Reading notifications, swiping through Google Now cards and navigating maps is a pleasure"

320 resolution, and it's bitingly sharp. Blacks look black, colours look rich and punchy. Reading notifications, swiping through Google Now cards and navigating maps is a pleasure. Our only serious grumble is that it's hard to see when you're out in the sun.

There are even more goodies when you turn the smartwatch over. As well as the contacts for the bundled clamp-on charging cradle, the Watch Urbane has a proper photoplethysmographic (PPG) heart-rate monitor. Use Android

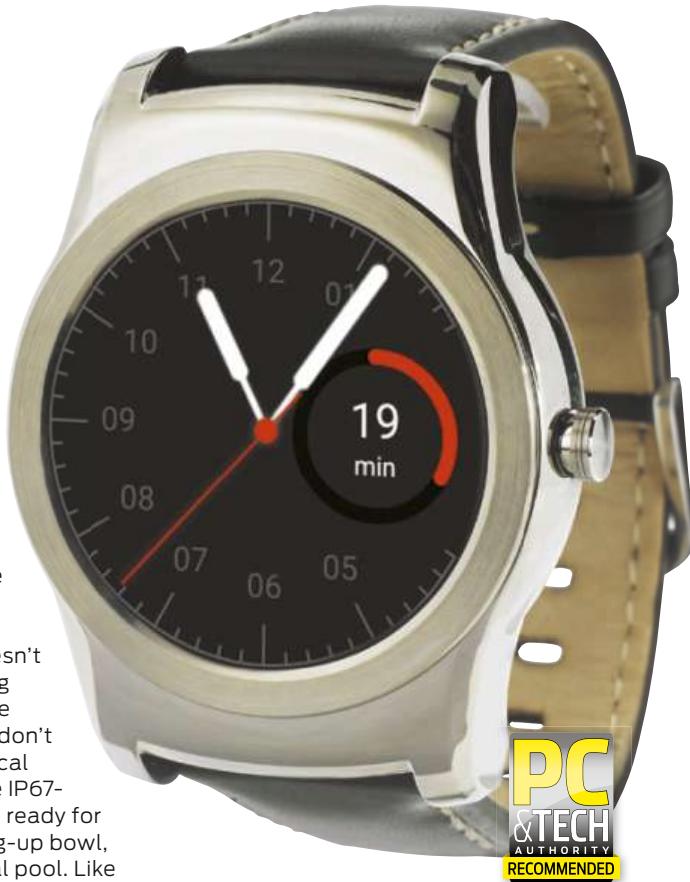
▼ The LG has a proper PPG heart-rate monitor

Wear's own heart-rate-monitoring functions and the results are all over the shop, but use the LG Pulse app and it's a different story, matching the Fitbit Surge and Apple Watch for credible results.

The Watch Urbane doesn't nod off when it's counting steps, either, although the leather strap and design don't make for the most practical fitness watch. It might be IP67-rated, but that means it's ready for a quick dip in the washing-up bowl, not a few laps of the local pool. Like the Apple Watch, the Watch Urbane is better suited to nudging your average, moderately active person along the right path than for any serious training.

Beyond LG Pulse, a rather pointless touch-based phone dialler and some specially designed watch faces, the Urbane is a fairly straightforward Android Wear watch. Even so, it's still the best. The wearable OS is maturing nicely, and LG's hardware does a great job of showcasing it. After a day or so of use, the flicks and taps to view and dismiss notifications, launch apps and flick through Google Now cards become second nature.

Top up the built-in app selection with your favourite fitness apps or must-haves such as Wunderlist and ViewRanger, and the Watch Urbane becomes a great smartphone companion. You can respond to texts and emails using voice, ready-made replies or hand-drawn emoji, and LG's microphone doesn't have any problems with voice recognition. New actions enable you to scroll through notifications with a flick



PC & TECH AUTHORITY RECOMMENDED

of your wrist, and these work reliably when you haven't got a free hand.

It's also likely to last. With a Snapdragon 400 processor and 512MB of RAM, performance is impeccable, and the Watch Urbane should be equipped to cope with future Android Wear updates. Even battery life is excellent: we wouldn't quibble with the predicted battery life of more than 60 hours, which is about as good as it gets with an Android Wear device.

This isn't the ultimate smartwatch, and Apple's design nous and attention to detail is leagues ahead of LG's. Those who don't like the styling might prefer the Watch Urbane's stablemate, the cheaper G Watch R. If you like its looks, though, don't hesitate. The Watch Urbane is one storming smartwatch.

KEY SPECS
\$349 • www.lg.com

OVERALL



Acer Liquid Leap

A CHEAP FITNESS BAND/SMARTWATCH HYBRID, BUT THE LIQUID LEAP WON'T LEAVE YOU CHEERFUL

Acer's leap into the smartwatch world is a hybrid band, packing a handful of smartwatch features into a low-cost fitness device. It looks low-rent, and our white review sample was hard to keep clean, if reasonably robust. Acer claims it's waterproof, although only for up to 30 minutes in depths of up to one metre. Paddling pool swimmers only, then.

Officially the Liquid Leap isn't on sale yet in Australia, but can be bought online. We acquired one so in the interests of an all-encompassing group test have included the review.

It's not hard to find evidence of the low budget. The strap is comfortable but hard to fit, with studs that only just squeeze through the holes provided. It charges via a tiny plastic cradle that feels like it fell out of a Christmas cracker, with an awkward clamp that clicks in place over the watch. The simple monochrome OLED screen has a poor 128 x 32 resolution, and is only just bright enough to see in sunlight. The Liquid

Leap eschews any sophisticated sensors, packing only an accelerometer for step and motion tracking, and the capacitive touchscreen.

The best thing about the Liquid Leap, beyond the price, is that it's very simple to use. It pairs easily using Bluetooth, while the Leap Manager apps for iOS and Android make it easy to set and track fitness goals. Notifications for emails, messages, calls and events come through smoothly, and you simply sweep through the fitness function to find the music-player control app.

However, none of these functions performed brilliantly. The step counts didn't tally with those of specialist fitness bands when used on a walk, while space for notifications is so limited you barely see more than a subject line. Its sleep-tracking features aren't exactly impressive: you turn the app on when you go to bed and turn it off when you get up, and that's as sophisticated as it gets.

You'll struggle to find a more affordable



smartband and, at a projected 60 hours, battery life is excellent. The Leap also offers basic notifications and fitness tracking, which is more than can be said for the Fitbit Surge. All the same, you'd be better off buying a budget fitness band without smartwatch pretensions or saving up for a proper smartwatch.

KEY SPECS

\$110 • www.acer.com

OVERALL



Asus ZenWatch

A GOOD-LOOKING, FEATURE-PACKED WATCH, BUT IT DOESN'T HAVE THE BATTERY LIFE TO CLAIM AN AWARD

Three things single out the ZenWatch from its Android Wear brethren: a lovable old-school style, a lack of physical controls, and a large AMOLED screen. In fact, the display isn't much bigger than that of the Sony SmartWatch 3, nor is the 320 x 320 resolution any different, but its 296cd/m² luminance levels, deep blacks and rich colours make it easier on the eyes in all conditions other than bright sunlight. Notifications are more legible, and you can see greater detail when navigating with Google Maps.

Despite its size, the ZenWatch is slim, light and very comfortable to wear. The hinged clasp holds the classy leather strap securely, and while it's not as tough or as waterproof as other watches, it's dust- and water-resistant enough to allay any fears of it breaking. Throw in a selection of smart custom watch faces, and this is definitely one of the best-looking Android watches around.

The ZenWatch has a heart-rate

monitor, but it's integrated into the bezel. Launch Asus's own Wellness app, and place your index or middle finger on either side of the bezel, and you can test your heart rate or run a bizarre relaxation test. While we wouldn't describe the latter as accurate, heart-rate measurements were within five beats of those measured using the Microsoft Band and Fitbit Surge. Sadly, the way it's implemented makes it all but useless for activity tracking.

With a 1.2GHz Snapdragon 400 processor and 512MB of RAM, the ZenWatch is very responsive. Apps launch quickly, and you can flick from function to function in an instant. We also like Asus' add-on extras, including a companion app for muting your Android phone and a remote shutter for the camera.

In fact, there's only one thing that lets the ZenWatch down: battery life. With a projected 30 hours in our tests, it's the worst of any watch this month. One morning we put on the ZenWatch with 54% of the battery life remaining,



and it didn't even make it to 3pm that afternoon. Keep it charged every day and it's a contender, but not durable enough to topple our award-winners.

KEY SPECS

\$195 • www.asus.com.au

OVERALL



Fitbit Surge

A WORTHY CHOICE FOR FITNESS FANATICS, BUT THE SURGE HAS TOO MANY FAILINGS AS A SMARTWATCH

Described as a “fitness superwatch”, the Fitbit Surge could do with a little slimming down itself. It’s a surprisingly thick, wedge-shaped unit integrated into a chunky rubber band and, while light and very comfortable, it looks dated. What’s more, there’s a surprisingly thick bezel around the 1.25in monochrome TFT touchscreen, which only makes the display look smaller. Throw in the fact that the transreflective screen is rather dim when used indoors, and the Surge doesn’t look or feel all that super.

Neither is it much of a smartwatch. You receive texts and call notifications, but that’s about it – there are no alerts for emails or events. This is a bit embarrassing when even bargain-basement smartwatches such as the Liquid Leap cram them in. If Fitbit has any sense, it will make better notifications a priority.

Beyond such disappointments, the Surge doesn’t fare badly as a fitness

watch. You can swipe through the day’s basic fitness info easily, then flip quickly between the different modes to start and store data on an activity. Go for a run and it does a great job of tracking heart rate, steps, calories burnt and other relevant data. Heart-rate and activity tracking seems reasonably accurate, delivering beats per minute and step counts in line with those from the Microsoft Band.

The Surge’s biggest strength is Fitbit’s established fitness apps and systems. Goals and achievements encourage you to keep plugging away, and vibrating notifications when you reach a goal give you instant gratification. The iOS and Android apps are easy to navigate and beautifully designed, and there’s a nice balance between exercise stats, accessibility and fun. Sleep-tracking features are particularly strong, using heart-rate and movement data to analyse and highlight patterns.

For all the Surge’s failings as an



attractive timepiece and smartwatch, we like it as a fitness band. However, despite its lack of heart-rate monitoring, we like the Garmin Vivoactive even more.

KEY SPECS

\$349 · www.fitbit.com

OVERALL



Garmin Vivoactive

A SO-SO SMARTWATCH, BUT A STAR PERFORMER WHEN IT COMES TO FITNESS-TRACKING FEATURES

Like the Fitbit Surge, Garmin’s Vivoactive is a fitness watch with smartwatch pretensions – but, unlike the Surge, it makes those features count. You’ll miss out on complex apps, voice-powered search, turn-by-turn navigation and the ability to dictate messages, but the Vivoactive does out email, text, phone and event notifications, and you can expand it with apps and watch faces via the Connect IQ store.

The slab-like square design is humdrum but functional, and there’s nothing overweight or irritating about the design. The transreflective LCD screen makes sparing but intelligent use of colour, and while the 205 x 148 resolution doesn’t exactly pack detail, it’s easy to read in all conditions. Most importantly, the combination of taps, swipes and actual buttons soon becomes intuitive. You use the touchscreen to swipe through notifications or activities, but the buttons come in handy for, say, quickly pausing then restarting activity tracking.

The Vivoactive doesn’t offer heart-rate tracking, but it does work with ANT+ chest straps, and compensates further with excellent GPS. It’s quick to get a reading, and when you go on a walk, a bike ride or a run, it does a fantastic job. It tracks your route and monitors not just the obvious stuff, such as steps taken, average speeds and calories used, but more technical data, such as cadence. You can check it all out using the excellent Garmin Connect app, which rivals Fitbit’s for in-depth data and slick presentation.

After all this fitness goodness, the smartwatch side feels basic. Notifications are heavily truncated, acting mostly as a signal to pull out your phone. If you receive lots of notifications, you’ll soon find that there’s not much room in the queue; old ones are simply bumped out.

The Garmin’s other big selling point is battery life. You’ll comfortably see more than ten days of solid use unless you use GPS frequently, which can sap the battery within eight hours. For most people this



won’t be a problem, and Garmin’s simple, clip-on cradle makes it easy to top up as and when. It’s only a half-decent smartwatch, but it’s an absolute belter of a fitness device.

KEY SPECS

\$339 · www.garmin.com

OVERALL



Microsoft Band

BIG ON FITNESS, BUT NOT SO STRONG ON STYLE, AND ITS SMARTWATCH FEATURES ARE LIMITED

The best thing you can say about Microsoft's design is that it's tough and utilitarian. The worst? That it looks like you're wearing an electronic tag. Still, while the Microsoft Band might make you look like a young offender, it's comfortable when fitted properly, using the ratchet clasp to get a good, tight fit around the wrist.

This is primarily a supercharged fitness band, and the amount of data the Band collects is impressive. Between UV monitors, galvanic skin sensors, accelerometers, gyroscopes and an optical heart-rate monitor, the Band is busy both while you're exercising and while you're going about your everyday life. Even the sleep-tracking features are extensive. While a chest-band heart-rate monitor will generate more accurate results, readings from the Band were very close to those from the Fitbit Surge and Apple Watch. Using Microsoft's Health app on Windows Phone 8.1, there's plenty to get your teeth into.

The Band has a lot of smartwatch features, accessed through a range of tiles you can install from the Health app. Messages, emails, events and more are up for grabs, and you can also use the Band to talk to Cortana on your Windows phone. It's great when it works, and Cortana keeps getting better at dealing with reminders, quick emails and local search. The interface is deliberately simple and intuitive, and the Band doesn't bite off more than it can chew.

However, the small screen, while bright and clear, only has room for three lines of text, so notifications are cut right back. Other features prove frustrating – asking Cortana for directions or information sends you back to your phone, for example. We also had difficulty getting notifications to work reliably, both from a Lumia 735 running Windows 10 Mobile Insider Preview and a Lumia 820 running Windows Phone 8.1.

Battery life is good at a projected 53 hours, we love the Band's welcoming



cross-platform approach, and it's keenly priced. We only wish that the hardware were more attractive and the software more functional.

KEY SPECS

\$277 · www.microsoft.com

OVERALL



Motorola Moto 360

A DECENT SMARTWATCH LIES BENEATH THE BLING, BUT PERFORMANCE AND BATTERY LIFE HAVE BEEN BETTERED

Motorola was the first smartwatch manufacturer to deliver a round watch, and while the Moto 360 now faces competition from LG, it's still one of the best-looking Android Wear devices. Not everyone will like the large 1.56in face, the 49g weight or the bling of our sample's light gold strap and finish, but in its black and silver versions it's a comfortable, elegant timepiece.

It's strong in other ways, too, packing in a heart-rate sensor for health apps and an ambient-light sensor to control the screen's brightness. The larger screen size and 320 x 290 resolution means both a black strip at the bottom of the display and a lower pixel density than the LG Watch Urbane, but it's crisp and very bright – we measured maximum brightness levels at 508cd/m². Google Now cards, emails and notifications are all easy to read, and the microphone does a fine job with Google Now and dictating texts or emails.

Android Wear has improved

significantly since the Moto 360's laur last year. It's easier to access apps, you can use wrist gestures to scroll through notifications, and maps and navigation now work much more effectively. What's more, Motorola's own Moto Body app makes the most of the accelerometer and heart-rate monitor to track steps and cardio data, watching for signs that you're exercising and logging the results. Those looking to boost their fitness rather than getting stuck into proper training may find it's all they need.

Unfortunately, the Moto G falls down in a few key areas. Battery life is mediocre – even in our light-use tests we measured around 38 hours – and the 360 feels sluggish. It's not exactly unresponsive, but the 1GHz TI OMAP 3 processor is clearly struggling with the workload, and that will only increase with future Android Wear revisions.

Rival smartwatches flick from function to function with noticeably more snap.

The Moto 360 is worth considering



for its price, particularly if you avoid this overpriced gold version, but it's no longer the leader of the Android pack.

KEY SPECS

\$220 · www.motorola.com.au

OVERALL



Pebble Time

NOT THE MOST ELEGANT SMARTWATCH, BUT IT'S FUN AND THE BATTERY LIFE IS STELLAR

Pebble has won a sizable userbase by focusing on core smartwatch features and handling them well. The Pebble Time might have the luxury – for a Pebble – of a colour display, but it hasn't lost sight of the ethos. If a long battery life, useful apps and at-a-glance notifications matter most to you, this is a great smartwatch.

It won't be to everyone's taste. The Time is simple and solidly built, but the thick bezel is hardly elegant, and in some ways the styling's a step backwards from the grown-up Pebble Steel (a Steel version of the Time is imminent). The screen is colour, but a limited resolution and colour palette mean that everything looks like it belongs on an old 8-bit PC. It's telling that the Pebble's best watch faces – and there's a growing selection – embrace a kind of knowing retro cool.

The Pebble prioritises function over form. There's no touchscreen, but everything can be done through three buttons on the right and one on the

left, and basic operations soon become intuitive. The polysilicon e-paper screen is actually more legible in bright sunlight, and the backlight kicks in when any alerts arrive.

The Time handles notifications well, mirroring them as they arrive on your Android or iOS phone. You can reply to texts with ready-made responses, or dictate a short reply using the microphone. And while the Time might not have all the built-in functions of Android Wear watches or the Apple Watch, there are apps to cover most bases, including a healthy selection of fitness, walking and travel apps – Runkeeper, Stroll and TripAdvisor are all on board. Many feel primitive, however, and not all work reliably: TripAdvisor and Stroll occasionally refused to connect to the phone in our tests.

The Time's biggest strength is battery life. With a projected runtime you can almost measure in weeks, it's streets ahead of every other full-fat smartwatch



here. Even in heavy use it should last five days. This isn't the most desirable or high-tech watch, but it is one of the most usable. Provided you can live with its looks and limitations, it's well worth \$320.

KEY SPECS

\$320 • www.getpebble.com

OVERALL



View from the Labs

THERE IS NO MORE SUBJECTIVE PIECE OF TECHNOLOGY THAN A SMARTWATCH, SAYS STUART ANDREWS, BUT DON'T GET SADDLED WITH A POOR PERFORMER

Let's face it, barring Google Glass and the kind of high-tech adult toys we're not too keen to review in PC & Tech Authority, technology doesn't really get more personal than this. That means that a smartwatch that looks and feels right to one tester doesn't always look and feel right to a colleague. Software that's intuitive to someone from an Android background feels less intuitive to someone coming from iOS.

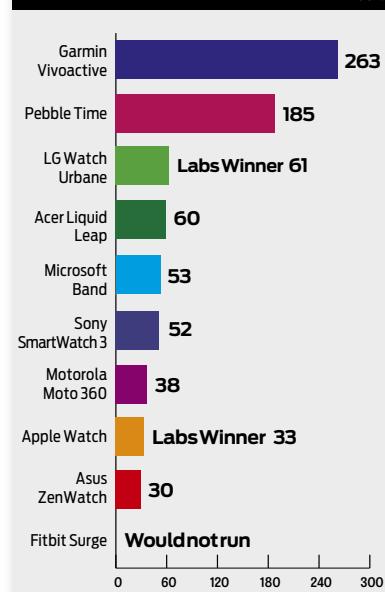
In fact, in most respects you already made a choice about your smartwatch when you bought your smartphone. If you bought an iPhone, Android Wear watches are off the table. Likewise, the Apple Watch is dead to anything but an iPhone (and even then you'll need an iPhone 5 or above). Only Microsoft, Fitbit, Acer, Pebble and Garmin cater for both iOS and Android users – and if you prefer Windows? Well, we hope you like the Microsoft Band's distinctive style.

In the end, five devices stand out for different reasons. The Pebble Time

doesn't look stunning or feel high-tech, but its retro cool and sense of fun are infectious. The Garmin Vivoactive is a barely adequate smartwatch, but a belter of a fitness device. The Sony SmartWatch 3 is more middle of the road than driving your Ford Focus to see James Bay play Milton Keynes, but it's a very cheap and capable Android Wear device. When it comes to class, features and performance, the LG Watch Urbane and Apple Watch Sport come out on top.

On paper, the Watch Urbane is the heavy hitter; its battery life is better and it's an easier sell on value for money. The Google Now-focused Android Wear is a much cleaner and more intuitive UI than it used to be, and everything from getting directions to dictating emails is handled with aplomb. Yet you can't deny Apple's design sense and attention to detail in the Apple Watch Sport. It's light and comfortable to wear and a real pleasure to use. Sure, it's arguably overpriced, but that hasn't held back the iPhone, the iPad

BATTERY LIFE



or the MacBook family. People don't buy Apple products because they outperform the competition, but because they prefer the way they work and feel. Here, the same applies. Neither watch is perfect, but each shows a category moving forwards with confident strides.

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Design your own watch face

YOU DON'T HAVE TO SETTLE FOR THE SELECTION OF WATCH FACES THAT COME PREINSTALLED ON YOUR SMARTWATCH. HERE'S HOW TO CREATE YOUR OWN

One of the joys of owning a smartwatch is having the ability to change your watch face. Have a classic chronograph look one day, a digital face the next, some fancy animated face after that – it's like wearing a different watch every day. The Pebble and Android Wear stores are packed with custom faces covering everything from retro styles to Hello Kitty, and even Garmin's Vivoactive can use alternative faces, courtesy of the Connect IQ store.

What if you want to build a watch face from the ground up? Well, depending on your smartwatch, there are tools available to do just that.

APPLE WATCHOS

Bad news if you want to make your own Apple Watch faces – Apple has decided to maintain tight control of watch-face design, rolling out only ten faces in watchOS 1. Some of these can

be customised extensively, however, with different colours, animations, complications (Apple's watch-face widgets) and layouts from the watch-face gallery. Force Touch your current watch face, swipe left and right through the alternatives and you'll see a Customise button beneath each option. Tap it to start customising.

Sadly, some watch faces are barely customisable at all. It's clear that Apple's focus is on maintaining a coherent style and optimising battery life – it's no coincidence all the faces have black backgrounds – but that won't cut any ice with those who want to tailor their watch. Apple is promising greater control with the forthcoming watchOS 2.

ANDROID WEAR

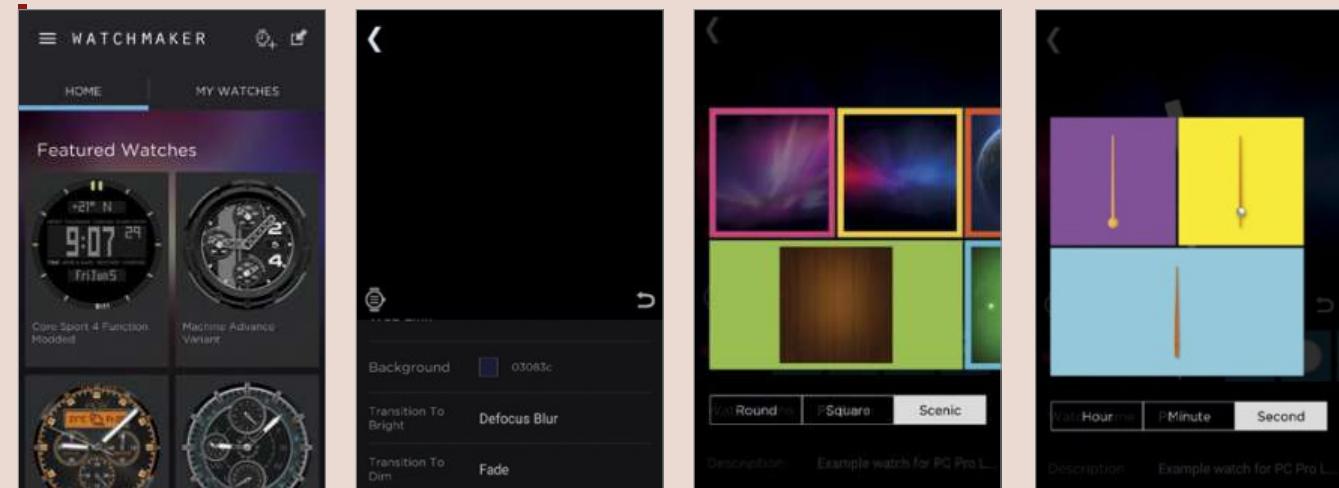
Of all the major smartwatch operating systems, Android Wear is the most customisable, partly because Android

Wear and the hardware support more colours, more visual options and higher-resolution displays.

Several watch-face design apps are available, all of which will run on a connected Android phone or tablet. Facer offers serious levels of control, down to background images and the exact font, size, colour and placement of every portion of the time and date, but the interface is bewilderingly complex, and building your own watch face will be too much hard work for most.

WearFaces is a little easier to get your head around, but positioning the time and date involves trial and error, while the user-configuration options are rather limited – it's more a vehicle for downloading and customising some brilliant WearFaces watch-face packs than a serious tool for producing your own. Our favourite Android Wear option is WatchMaker. The free Watch Face version

BUILD A WATCH FACE FOR ANDROID WEAR WITH WATCHMAKER



1 Launch WatchMaker and go to the homescreen. Now tap the icon with the watch symbol and the plus in the top-right corner to design a new watch. Now tap the Design Watch button.

2 Scroll down to give your face a name and enter a description. Then, more importantly, set a background colour and the transitions from Dim to Bright and Bright to Dim. Bear in mind that with many watches using a bright colour will have a negative impact on battery life. Now scroll back up and tap the + button to add your first layer.

3 Swipe left to right to see the different types of content you can add to your new layer, then tap on one to drill down further into the options. Here we've tapped on Watch Backgrounds, then on the Scenic category.

4 Obviously, you'll need watch hands or a digital display so that your watch face tells the time. Here we're going for an analogue style, so we need to add three watch hands, tapping on the Hours, Minutes and Seconds buttons at the bottom to make sure that we get one hour hand, one minute hand and one second hand.



is fairly limited, with many of the better customisation features locked, but pay the very affordable \$2.99 for the Premium version and you can import your own graphics and add a multitude of widgets to your watch face. As with Facer, you build up your new watch face layer by layer, with a different component – the hour, minute or second hand, a weather

widget, a battery gauge – on each layer. With WatchMaker, however, it's easier to resize, reposition and customise each layer, and the built-in components are more stylish and functional.

PEBBLE

The Pebble's community-led, DIY-friendly ethos mean that custom watch faces

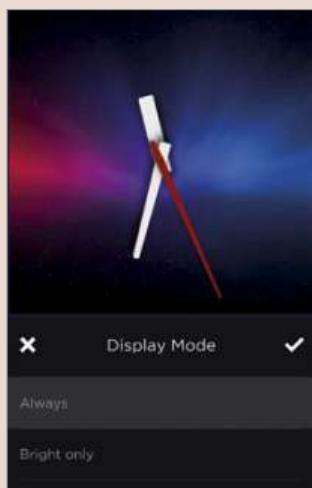


are very much on the cards. You can actually code your own; there's a good tutorial available at pcpro.link/253watch. Alternatively, you can use the online Watchface Generator tool (watchface-generator.de), although the version for creating colour Pebble Time faces is currently a preview.

This allows you to design your own face – complete with different analogue and digital styles, text, background images, and battery and connection status widgets – using simple dropdown menus and sliders. It's surprisingly flexible, and the wysiwyg editor ensures that you get reliable results.

There's also an Android app, Canvas for Pebble, where you can build your watch face layer by layer, adding new layers for analogue or digital time plus battery, SMS and email indicators. What's more, it's extendable through plugins, although only Now Playing music and Notification plugins are currently available.

It's a fairly complex app with a slightly idiosyncratic way of working, but as the preinstalled Canvas faces very clearly demonstrate, you can achieve sophisticated results.



5 Once a layer is added, you can scroll down to edit its attributes, including size, position, alignment and colour. You can also set whether that layer appears in the dim mode when the face is set to Always On mode, or whether it appears only when the watch face is bright. To save battery life, only have the most critical elements – the time and possibly the date – visible while dim.



6 To add a date, add a new layer and find the date category. You can set the date format by tapping on the down arrow in the Text box, and set other attributes such as the font, size, position and colour by scrolling down to the different settings.



7 You can add extra components (such as a weather widget or a battery meter) by adding layers and choosing from the elements provided. Be careful with sizing and positioning – it's quite easy to position components incorrectly. You may also need to reorder your layers so that, say, the watch hands remain on top at all times. To do so, tap and hold on a layer's thumbnail, then drag it left or right.



8 Finally, you'll want to export your new watch face to your watch. Tap the back button in the top-left corner, then tap the green Set Watchface button at the bottom. One quick sync later, and your watch will have a brand-new face.



WELCOME BACK TO UPGRADE AUSTRALIA

The second Upgrade Australia event proved to be bigger and more exciting than the first, signalling great things for the future of the event.

The combined forces of PC & Tech Authority, PC PowerPlay, Hyper and Atomic took over the UNSW Roundhouse and brought together technology vendors and tech savvy fans for a night of information overload, fun, prizes, food and drink. After a brief bit of mingling and checking out some of the tech on display, MC Steve Kiernan, Editor of CRN, got the show on the road.

Graham Tucker, ANZ Technical Manager for Intel kicked off the talks, detailing the design process behind the new Skylake CPUs as well as the philosophy behind the Tick-Tock development and distribution cycles of CPUs. Mr. Tucker also spoke about the blazingly fast Intel 750 1.2TB PCI SSD, currently the fastest consumer SSD in the world. Intel are giving away three of these drives in a competition. If you're interested in entering the competition, head over to <http://www.pcauthority.com.au/upgradeaustralia/> for more details. Graham concluded his talk with giveaways of three Skylake CPUs - two i5 and one i7 - and a lively Q&A.

Lee Edgerton from Microsoft followed Graham to laud the merits of upgrading

a PC to Windows 10. Early in his talk, Lee surprised himself when asking the crowd how many people owned Windows phones. To everyone's surprise the number of hands that shot up was far larger, as Lee pointed out, than what market share would dictate. The real highlights of Windows 10 shown during Upgrade Australia were the Xbox App and DX 12. The Xbox App, as demonstrated on the Microsoft stand, can stream almost lag free gaming content from an Xbox One to any Windows 10 device - PC, tablet or phone. Little has been shown of DX 12 games as yet, but Windows 10 is the only way to get it at the moment.

Following Microsoft was Josh Collins from Asus talking about the range of Z170 motherboards as well as brief look at the Asus range of graphics cards. Strutting around the stage like a member of the Beastie Boys, Josh detailed the significant upgrade of sound chip on the high end Z170 boards, essentially placing a free \$200 sound card directly on the board. The boards also boast a number of super-fast memory connections, USB 3.1, Thunderbolt 3 and pretty much everything else you

could want for future-proofing. Josh finished his talk with a prize giveaway, giving one lucky punter a Strix Tactics Pro keyboard, A Strix mouse, Strix 7.1 headphones and a mouse pad. Not at all a bad haul for coming to a free event.

The final speaker in the line-up was Dino Strkljevic from Gigabyte. Dino kept his presentation brief, detailing the new sound chip on the high end Z170 motherboards as well as the fact that Gigabyte are offering Thunderbolt 3 over USB type C connectivity on their boards, enabling one USB type C slot to be used for power, Display Port and data transfer at ridiculous speeds. Rather than taking up too much time on stage, Dino has something special in store for 10 members of the audience - a chance to try liquid nitrogen extreme overclocking. The two teams of five competed for the top of the line Gigabyte Z170 motherboard. Nitrogen filled the air and there were many jealous looks from the audience members not chosen.

After the talks there was more food, more drinks and more talking to representatives from Intel, Microsoft, Mwave, Asus and Gigabyte. Success.

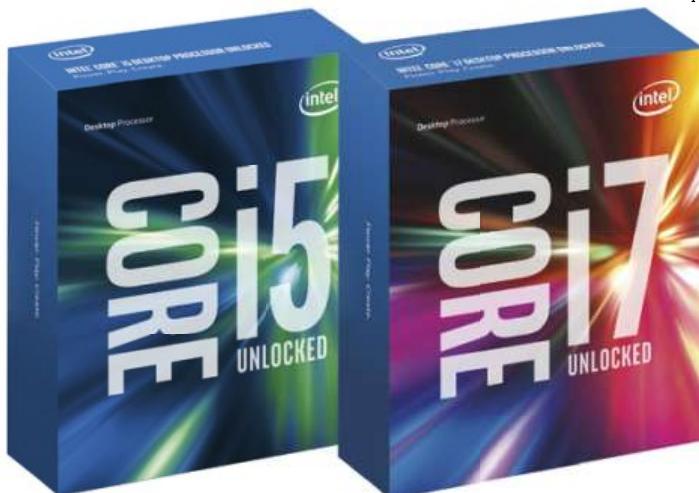


Intel's 6th Generation Core Processor

The perfect CPU upgrade

Formerly codenamed Skylake, the 6th Generation Intel Core processor has landed on Australian store shelves. The latest in Intel's powerful family of CPUs delivers even better performance than its predecessor, yet does so using the most energy-efficient design Intel has ever created. Last month in Upgrade Australia we looked at the new LGA 1151 motherboards that support this CPU, based around Intel's Z170 chipset and bringing a plethora of new features such as plentiful USB 3.0 and Ultra M.2 connections. This month we're focusing on the CPU itself, to see what changes have been made to make this the fastest mainstream desktop processor available.

The first release of the 6th Generation Intel Core processor comes in two flavours. Mid-range users will likely favour the new i5-6600K, a quad-cored processor with a default speed of 3.5GHz, which uses Intel's Turbo feature to increase to 3.9GHz when tasked with heavy duties. Performance users are served by the i7-6700K, which also features four physical processor cores. Not only does it run faster, with a default speed of 4GHz increasing to 4.2GHz when Turbo is activated, it also includes Intel's Hyper-Threading technology to deliver better performance via four additional virtual cores in multi-threaded applications or when multi-tasking.



GAME-READY

Both CPUs feature the same improvements that separate the 6th Generation from previous Intel products. Numerous changes to the chip's four CPU cores bring performance boosts of up to 10% in activities that don't involve graphics, such as word processing, file archiving or virus scanning. However, the biggest performance increases are found in the processor's Integrated Graphics Processing Unit found on these chips, or iGPU for short. This acts just like a graphics card, but is built into the CPU, and both of the new CPUs feature Intel HD 530 Graphics. When compared to the HD 4000 Graphics iGPU found on the i7-3770K, the new iGPU is anywhere between 30% and 50% faster, depending on the game being used. This makes the new Core processor a value-packed offering for casual gamers, who don't need the performance of a \$300+ dedicated graphics card.

LOWER POWER BILLS, COOLER OPERATING TEMPERATURES

Intel's newest CPUs are built on its industry-leading 14nm manufacturing process, which delivers dramatic power savings compared to the 22nm process introduced three years ago, and even more than the 28nm process used by competitors. This will be especially

noteworthy in mobile

users such as laptops and desktops, where lower power requirements translate to a more comfortable life on the move.

A side-effect of the reduction in power usage is also a lower operating temperature, which means new fans can use



quieter or smaller forms of cooling. When combined with changes to the CPU's voltage regulation, which has now been removed from the CPU and put onto the motherboard, they're also able to operate in a wider range of thermally challenging situations. No longer will the cramped confines of a Home Theatre PC residing in an AV cabinet require an annoyingly loud CPU fan to stay cool.

A TWEAKER'S DELIGHT

Any sixth generation Core CPU that has a K at the end of its product name supports overclocking via the use of multiplier adjustments. This simple process allows tweakers to extract even faster speeds out of these CPUs in a matter of minutes, but the new CPUs also reintroduce a form of overclocking known as BCLK adjustments. This allows for much finer control of the CPU's speeds to help you really push this CPU, should overclocking be your thing.

No matter how you use your PC, whether it's playing League of Legends, doing 4K video editing or simply browsing the web, the 6th Generation Core CPU will do it faster and more efficiently than ever before.



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WINDOWS 10 for gamers



Enjoy the gaming benefits of Windows 10, and the embedded symbiosis between Microsoft's latest operating system and its newest gaming console, the Xbox One

For years, PC gamers and consolers have been at odds. After a few generations of internet-enabled consoles, PCs and consoles still operate in segregated spaces. Until now. Windows has been the go-to platform for PC gaming for years, but now with Windows 10, Microsoft is taking gaming more seriously than ever before.

BUILT FOR GAMING

Windows 10 has been built with gamers in mind. Those who own a compatible video card, or are planning on purchasing one, can take advantage of DirectX 12. This latest Microsoft-forged application programming interface (API) promises a combination of richer visual fidelity and faster performance that's built into Windows 10. "Our aim is to ensure the best and most advanced graphics technology across all devices to get the very best gaming experience, no matter what hardware you are using," says Xbox Australia Business Lead Jeremy Hinton.

For games designed specifically for Windows 10, the benefits are clear: "Reduced power consumption and increased performance for games utilising DirectX 12, which is only on Windows 10 and Xbox One," says Hinton. PC gamers on Windows 10 can take advantage of the benefits of DirectX 12 in a range of future

▼ Fable Legends is just one of the incredible new games built for Xbox One and Windows 10



titles, including Gears of War: Ultimate Edition, Deus Ex: Mankind Divided, and Hitman. DirectX 12 also embraces high fidelity with inbuilt improved scaling for 4K monitors.

XBOX BENEFITS

Some of the best features of the Xbox One console have been integrated into Windows 10. "You can use the Xbox app even if you don't own an Xbox One console to record games and create clips from other apps," says Hinton. "All you have to do to enable this feature on Windows 10 is to press Windows + G and you can record, edit and share game clips within your social networks." The editing and sharing is achieved by way of Windows 10's built-in Xbox app. This app also allows users to take advantage of the robust Xbox Live network, which is free to use for compatible PC games. Connect with friends playing on the Xbox One, send messages, earn Xbox Achievements, or start a party chat with them, across platform, even if you're not playing the same game.

Windows 10 users will soon be able to play with and against Xbox One gamers. "It enables a far larger pool of players for you to compete against when you combine Windows 10 and Xbox One audiences," says Hinton. "We're excited to bring Fable Legends and Gigantic as some of the first experiences to adopt this." Fable Legends and Gigantic are due for release before the end of the year, and Hinton anticipates a number of ID@Xbox titles will take advantage of this feature.

PERKS OF XBOX OWNERSHIP

Windows 10 already has compatibility with Xbox One controllers, with plans for more peripherals. "Xbox One controllers are compatible out of the box via the play-and-charge cable, and with our newly announced Xbox Wireless Adapter for Windows, you can wirelessly connect your



▲ This magical little dongle lets you connect up to four Xbox One controllers to a PC wirelessly! Pretty cool

controller to enable control and audio."

For those who already own an Xbox One, or are planning to buy one, Windows 10 can expand your PC games library by locally streaming compatible titles (including certain backwards-compatible Xbox 360 games) from Microsoft's new-gen console.* "We've recently enabled a 'Very High' mode, which will stream your games at 1080p and 60fps," says Hinton. "There's no discernible difference between playing on your Xbox One or on your Windows 10 device." Users can stream by wired or wireless local connections, with support for Windows 10-powered desktops, laptops and tablets.

Ultimately, owning an Xbox One and a Windows 10 device offers a more expansive gaming experience between and across platforms. Best of all, users who have compatible Windows 7 or Windows 8 devices are eligible for a free upgrade to Windows 10 within the first year of release.

* Streaming games from Xbox One to PC requires a compatible Xbox One controller



Microsoft

upgrade
AUSTRALIA 2.0

ASUS' NEW Z170 MOTHERBOARDS

Here we spotlight three of ASUS' potent new Z170 motherboards



ROG MAXIMUS VIII RANGER

The entry point to the Republic of Gamers (ROG) Maximus VIII series, don't make the mistake of thinking the ROG Maximus VIII Ranger lacks bells and whistles. This motherboard is a fully featured, gaming orientated motherboard injected with overclocking DNA from its established Maximus VIII stable mates.

Featuring extended connectivity options with support for USB3.1, PCIe x4 M.2, SATA Express and Intel i219 LAN with software and hardware optimisations courtesy of ASUS exclusive GameFirst and LANGuard, this board is ready to help you dominate the gaming arena.

Like a cherry on top, this board is rocking the ROG SupremeFX 2015 audio solution with amplification for 600Ω headphones, ESS Sabre DAC and a de-pop relay. Want the best? Demand ROG!

TUF SABERTOOTH Z170 MARK 1

Introducing the ASUS TUF Sabertooth Z170 Mark 1, an enduringly-tough new ATX motherboard with many exclusive TUF features. The features include trailblazing TUF Thermal Armour and TUF Fortifier technologies, TUF ICe, TUF Thermal Radar 2 and TUF Detective 2 for ultimate cooling, strength, easy monitoring and control.

Backed by a 5 year warranty, 1000+ component compatibility tests, 20% higher validated operating humidity levels and temperatures, the TUF Sabertooth Z170 Mark 1 is built to last.

Packed with the latest technologies such as USB3.1, PCIe x4 M.2 and supporting the latest Intel 6th Gen. Core processors, the TUF Sabertooth Z170 Mark 1 is ready to rumble!



Z170 PRO GAMING

Representing gaming orientated bang for your consolidated bucks, the ASUS Z170 Pro Gaming motherboard brings gaming focused features without breaking the bank. Boasting a strong feature set, both exclusive and general, the ASUS Z170 Pro Gaming is ready to deliver.

With ASUS exclusive features such as SupremeFX audio supporting 300Ω headphones, Sonic Radar II, RAMCache, GameFirst, LANGuard, DIGI+ VRM as well as Z170 platform standards such as PCIe x4 M.2, USB3.1 and SATA Express, the ASUS Z170 Pro Gaming is fit and ready to help you reach your gaming best!



Corsair Void

CHOOSE YOUR CONNECTIVITY AND SURROUND OPTIONS

Corsair's four new gaming headsets, launched all at once, are fundamentally the same but each has distinct functional differences to meet your connectivity needs, primarily. I really like what Corsair's done with this approach. The base audio gubbins is the same across the range, being a healthy 50mm driver that delivers a fairly fat yet clear sound. It's bassy and just slightly boomy, but never so it overwhelms music, or muffles important high-range gaming cues. Because the base \$99 stereo model benefits from the same audio internals as the pricier models, this is the one to have if you want excellent cans on a budget.

They're all also identical when it comes to cup design and cushioning, although there is some variance between the actual pad material. Despite the slightly funky shape they're flawlessly comfortable – hours passed in testing

without the slightest ergonomic annoyance.

So, that just leaves the connection options. The \$99 model uses a standard 3.5mm jack – which is also why the signal is stereo, not surround. Or, step up another \$30 for USB, and with that comes Dolby surround, as does each model above it. A further \$50 gets you the wireless model, and the range-topping \$199 'Ye Jacket' special edition scores a brighter colour scheme, but more importantly a 'base station' for the USB wireless dongle, allowing you to extend its reach, or place it in a more signal-friendly location.

This flexibility of choice is terrific, given the baseline audio quality. Some may be miffed that the \$199 cans deliver exactly the same audio quality as the \$99 model (ignoring 7.1 for the moment), but the big winners here are those in the



cheaper range. They're fantastic quality, supremely comfortable and appear to be very well made.

Ben Mansill

KEY SPECS

\$99 - \$199 • www.corsair.com
50mm, Frequency Response • 20Hz to 20kHz, Impedance • 32 Ohms, Sensitivity • 107dB (+/-3dB)

OVERALL



Roccat Nyth

The Nyth is a mouse dedicated to customisation. Although labelled as an MMO mouse, the fact that the buttons can be so easily changed both on the mouse and in the driver makes it great for most games that require more than just a few inputs. In addition to the left and right buttons, the Nyth boasts a rocker paddle that sits in between the fingers as well as up to 12 thumb buttons. The basic Nyth box contains a number of swappable thumb buttons, allowing users to choose the size and number of thumb buttons available and the drag and drop driver interface makes setting them up extremely easy. In case all those buttons aren't enough, the Nyth also features a shift key that enables each button to have a second function.

Daniel Wilks

KEY SPECS

\$199.95 • www.roccat.org
8 buttons • customisable thumb buttons • drag and drop customisation software

OVERALL



Poseidon Theron Plus smart mouse/Poseidon Z smart keyboard

The Poseidon Z Plus is a beautifully made mechanical keyboard, and the Theron Plus is a well-shaped, accurate mouse, but as it stands we can't recommend the smart mouse and keyboard over their dumb counterparts for a few reasons. The main selling point of the Z Plus and Theron Plus are that they feature Bluetooth connectivity and a phone/pad companion app that tracks click, movement, inputs and more, but we've had nothing but trouble with the connectivity, with the mouse constantly dropping out if connecting at all and the keyboard not faring much better. The mouse – all but identical to the excellent Theron also takes a bit of a design hit thanks to the shiny plastic shell that takes the place of the comfortable touch rubber coating of the basic Theron.

Daniel Wilks

KEY SPECS

\$95/\$129 • au.ttesports.com
Bluetooth connectivity and performance tracking software.

OVERALL



GIGABYTE™

The Best Choice For Your New PC



GIGABYTE ULTRA DURABLE™



Logitech G633 and G933 headphones

AS GOOD AS GAME CANS GET

In development for 18 months at its expansive US audio facility which I recently visited, Logitech's new gaming headphones aim high, and hit most marks. These are gaming cans we can recommend highly; although they certainly aren't the cheapest you can buy. Ostensibly the two models are identical, with the cheaper 633's eschewing wireless, though in testing the wireless G933's gain a smidge of amplification from the wireless circuitry and as a result have a slightly fuller tone.

Both sound fantastic, though. The sound is very clear and unadulterated by stealthed EQ stuffing things around behind the scenes. Our resident audiophile, Jez Ford (editor of Australian Hi Fi, which we publish), was impressed, describing a "slight squeezing of some female vocals at the high end, but otherwise perfect for music". In my game testing the sound is also top notch. Bass is tight and doesn't smother higher frequency ranges, and the mid range is well filled out – something many game headphones deliberately equalise out of the equation for more pronounced trebly gunfire and bassy explosions. Not so here, they cover all sounds without messing with each other, are thus accurate for competitive and yet most pleasant to listen to for long spells, bringing out the best from your games.

Surround imaging is impeccable. Better than any other gaming headphones we tested, and by some margin. This, mostly, is thanks to using the fairly rare DTSB Headphone X standard, in conjunction with Dolby 7.1, which replicates surround as it was created in the studio, thus giving you surround exactly as the game designer intended it in their studio, not some vague interpretation.

All this is achieved with a single custom 40mm driver in each cup. Compared to other cans with 40mm

or even 50mm drivers – or several such in a single model – these sound so good yet are also supremely comfortable is a huge win.

The design is a closed type, which is a concession most gaming headphones need to make to not drive friends and family mad. Open almost always sounds better, but the general sense of airiness is nevertheless good with these.

They're also super comfortable, up there with the best, although on occasion they will slip off your head if you're the animated type, or want to use these as simple music cans when out and about. They don't like to stay on with any sort of movement, in part because the band isn't especially tight (but good for comfort), and because the design puts the centre of gravity on the outer edge.

Three macro buttons are on the side of one cup, and with the included software each macro can cover personal sound profiles (EQ, voice morphing etc), as well firing up a custom lighting profile for the glowy bits, should you be into that.

If you're eyeing headphones of this quality it's a good chance you also take your PC audio seriously and have a nicer solution than the included USB sound card can provide -- although it is very good and if you've never used a nice sound card you will blissfully enjoy these, not knowing what you're missing. To get surround sound and macro support you need to use USB, but that's a standard game headphones thing. Both models do include a 3.5mm jack if you prefer to use your sound card or motherboard



audio, but the supplied 3.5mm cable doesn't split into

audio and mic, as it's intended to be plugged into your smartphone (it has an inline control, too), the idea being you can take calls while you're playing. If Logitech had included a cheap 3.5mm Y-cable, or splitter, in the box, sound card users could use it for game audio as well as their mic. Alas, you'll have to go out and buy one if that's your intended configuration, but at least that's an option. That all said, it's exceedingly rare that you get both USB and 3.5mm, so that's a plus.

The flip out mic is noise cancelling and as clear as you would ever want. My online gaming group all commented on how clear my voice was.

Logitech's pulled comfort, audio quality and features together in what seems to be a well built, sturdy device which is equally adept at gaming as it is at music.

Ben Mansill

KEY SPECS

\$279 (G633), \$329 (G933 · www.logitech.com.au)
Driver: (40 mm), frequency response: 20Hz-20KHz, impedance: 39 Ohms (passive), 5k Ohms (active), sensitivity: 107dB SPL/mW

OVERALL



GIGABYTE™

GIGABYTE Gaming Series Motherboard

BATTLE READY



WORLD OF TANKS
ROLL OUT



gigabyte.wg-event.com

Soma

DEEP HORROR TO THRILL
UNDER THE DEEP SEA

The underwater nightmare world presented in SOMA is wonderfully physical. Despite the biomechanical growths that thread through the underwater facility and the facility and the screaming monstrosities, neither machine nor human that wander through it, PATHOS-II, the underwater facility in SOMA feels like it takes place in a real physical space thanks to the nuanced environmental interaction available to the player. Draws can be slid open slowly to keep the noise down, different kinds of doors and locks require different kinds of interactions to open and anything not bolted down can be moved in some, hopefully beneficial, way.

SOMA is much more haunted house than it is action packed Resident Evil style survival horror game. It is, for the most part a game that combined maintenance with hide and seek as the player character makes their way through the PATHOS-II



facility trying to remain hidden from the creatures that roam its halls, all the while gathering information about what exactly is going on, repairing computers and solving puzzles.

There is no hand holding in SOMA. There are no visual indicators of where to go, no arrows pointing to objectives and no HUD to inform you of relevant objects, the proximity of enemies or the like. If you find a code somewhere in the facility you had better remember it or write it down, because the game won't do it for you, no matter how much you might need it later on. This lack of any helping hand adds to the feeling that PATHOS-II is a real place you're trapped in and adds immeasurably to the tension of the situation – frantically searching through notes to find the code for a door while the inhuman distorted

screaming of one of the monsters grows louder is a definite brown trouser moment.

Not everything in SOMA works. Stretches of the game that see the player leaving the facility and travelling across the ocean floor are little more than a slog and some of the voice acting clashes against the otherwise incredible sound design of the game. The overall story is a little weak too. Even so, wear your brown trousers – SOMA is a scary ride.

Daniel Wilks

KEY SPECS

www.somagame.com

Genre - Survival Horror • Developer - Frictional Games •
Publisher - Frictional Games • Platform - PC

OVERALL



Skyshine's Bedlam

UNIQUELY BEAUTIFUL AND GRATIFYINGLY DIFFICULT

Take equal parts Italian Mad Max rip-off, Oregon Trail and miniatures combat game and you have something resembling Skyshine's Bedlam, a turn based, Rogue-like strategy game in which players must pilot a giant tank/transport called the Dozer across a post apocalyptic desert in search of the fabled refuge of Aztec City. The desert, Bedlam, is populated with the dregs of the apocalyptic war; rogue AI, cyborgs, mutants and marauders, and while these violent factions hate each other, they definitely hate you more. To make matters worse, the warlord of Byzantine, the city you are escaping is not a fan of you either and wants you dead. Can you survive a trip through the wastelands and make it to freedom?

For the first half a dozen games, probably not. Skyshine's Bedlam is a difficult game. It's not just the desert factions that are out to kill you. The environment, the lack of resources and acts of god are just as likely to see your

mission end in failure. The Dozer contains a number of resources – passengers, crude (fuel), meat and power cells, and running out of any of them is extremely detrimental. Crude is needed to travel. Run out and it's game over. Meat is needed to feed passengers, or the passengers begin to die of starvation. Run out of passengers and it's game over. Passengers can be sold to slave traders for extra resources but they are a finite resource.

The most reliable way of gaining resources is fighting enemies but even there players are at a disadvantage. Up to six units, drawn from four classes can be



deployed in a fight. Basic units are weak but can be levelled up by gaining a set number of kills with them. Players have two moves a turn, as do enemies, but they also have a triple move round if they aren't dispatched soon enough. Combat is tough, weighted towards the enemy, and any unit lost on the field of battle is gone for good. Skyshine's Bedlam is uncompromising, sometimes painfully difficult and often cruel. That's what makes it great.

Daniel Wilks

KEY SPECS

www.obedlam.com

Genre - Strategy/Rogue-like • Developer - Skyshine •
Publisher - Versus Evil • Platform - PC

OVERALL

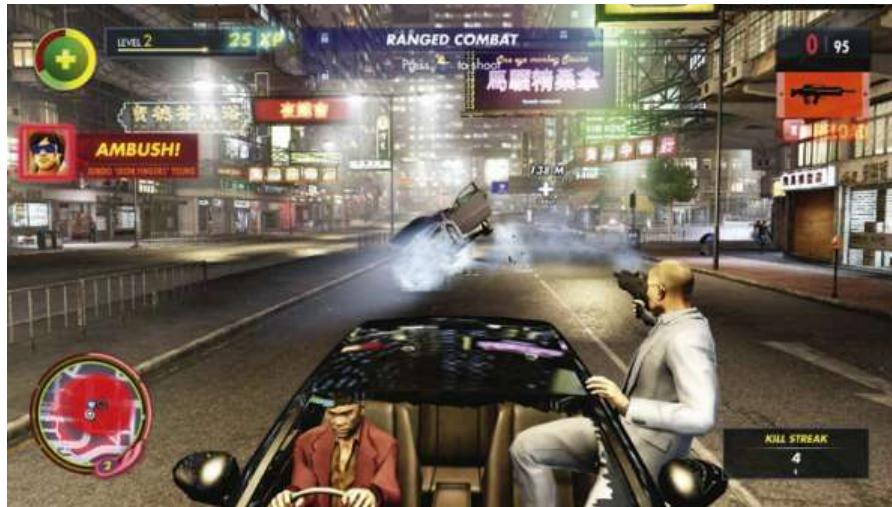


GIGABYTE™

GIGABYTE Z170 Series Ultra Durable™ Motherboards



LASTING QUALITY YOU CAN TRUST



TRIAD WARS

A FREE-TO-PLAY OPEN-WORLD ACTION TITLE
SET IN THE SLEEPING DOGS UNIVERSE

Sleeping Dogs was the spiritual successor to True Crime: one of a number of sandbox-style action titles that mimicked the successful Grand Theft Auto formula. For Sleeping Dogs fans, the hope was that the mysterious Triad Wars project would turn out to be an open-world massively multiplayer online experience, wherein thousands of players competed for turf, cars and leaderboard bragging rights.

In actuality, Triad Wars is a lot closer to the solo experience of Sleeping Dogs. Online connectivity plays a part, but in execution it's more player versus AI goons than players fighting with and against each other. A key component is raiding rival turfs controlled by other players. The lower the rank, the easier it is to fight your way through mostly unchallenging AI for quick rewards.

Higher-rank players have access to more intricate bases, passive protective perks (called "Favors") and tougher guards, as you race against the clock

to steal as much loot as possible and make it out alive. The trick is that your base is wide open to the same kind of player attack, which is why hard-earned currency is best invested in upgrading your turf early on.

Upgrading resource-generating facilities comes with the risk of creating too much money that an opportunistic player can pinch if you haven't manually collected it and put it in your warehouse. These facilities are called "rackets" and generate income on a cooldown timer, meaning it's wise to regularly clear the funds lest an invading player makes easy bank. It's clear that developer United Front Games has taken free-to-play cues from mobile games like Clash of Clans.

While attacking enemy turf is a fun and rewarding way to level up, failing to complete it in time or dying during the raid means you lose veterancy (called "Face"), which transfers to the defender. This is important because, on top of unprotected resources, Face is what you



score at the end of successful raids and is a big part of the levelling system.

Basic fisticuffs are a mixture of light and heavy attacks, offset with a grapple and counter button. Countering is a little too easy, and can be activated mid-combo, with enemies highlighted in a red hue to flag their attacks. It helps that goons only tend to politely attack one at a time, but it's a combat system very reminiscent of the Batman: Arkham series.

Grappling enemies offers the chance for contextual instant-kill takedowns that are as brutal as they are effective. Shooting mechanics follow the typical third-person cover-based logic that's part and parcel of the perspective these days. Keen-eyed players can take advantage of a risk/reward system that allows you to string together slow-motion headshots when vaulting over cover.

Outside of the raids, there are a handful of randomised missions scattered around the city. These break down into shooting, brawling and racing, or a combination of those elements. The core gameplay loop is relatively rudimentary, but it's afforded some depth from randomised Favor cards that buff health and core abilities, or unlock weapons and production facilities.

This latter point ties into a city-building game mechanic that lets players choose the type of rackets they want to construct and upgrade as you watch them expand from a bird's-eye perspective. As the coffers fill, there's a chance to grab easy cash in export missions that see you quite literally riding shotgun as you fire off rounds to keep enemy factions and police pursuers at bay.

Even when you're in the driver's seat, the arcade approach to driving is easy to learn and fast to master. This simplicity carries over to the training mechanics. While the game is initially quite confronting outside of the basic action-heavy gameplay loop, it does a good job of explaining each new feature as you encounter it, with the option to hone your skills in training as you unlock new abilities.

What Triad Wars lacks in notable visual fidelity it makes up for in hours of genuinely fun gameplay before you'll even be tempted to break out the credit card to fast-track the economy or your character.

Nathan Lawrence

KEY SPECS

www.triadwars.com

Genre - Action • Developer - United Front Games •
Publisher - Square Enix • Platform - PC

GIGABYTE™

GIGABYTE Z170 Series Motherboards



DESIGN FOR EXTREME COMPUTING



The A-List

ONLY THE BEST OF THE BEST MAKE IT TO PC & TECH AUTHORITY'S A-LIST

C lose but no cigar, for the Aorus X7 Pro-Sync (reviewed on page 43), as a contender for the Performance laptop category. We're fans of the Aorus design aesthetic and the way the company manages to squeeze top-end power into a slim and attractive body. But it's just too noisy to use day to day. So we're sticking with the standard X7, for now.

Some alternatives that have impressed lately in this category are the **Toshiba Kira**, **The HP Spectre x360** and the **Dell XPS 15** – all are worthy of inclusion.

ENTER THE SMARTWATCH

It's time to create a new category here in the A-List. Wearable tech is now mature enough to make strong recommendations. The inaugural entrant is the Apple Watch.

WHAT WE SAID:

You can't deny Apple's design sense and attention to detail in the Apple Watch Sport. It's light and comfortable to wear and a real pleasure to use. Sure, it's arguably overpriced, but that hasn't held back the iPhone, the iPad or the MacBook family. People don't buy Apple products because they outperform the competition, but because they prefer the way they work and feel. We wouldn't recommend stumping up for the premium versions, but if you want the best smartwatch of the moment, this is it.



PC DESKTOP

ALL-IN-ONE

Apple iMac 27in

★★★★★

PRICE \$2,199

SUPPLIER www.apple.com.au

If you can afford it, the 27in iMac is the finest piece of all-in-one engineering on the market. A truly powerful beast with performance to match its looks.

SPECIFICATIONS 3.2GHz quad-core Intel Core i5; 8GB DDR3

RAM; 1TB Western Digital Caviar Black HDD; NVIDIA GeForce GT 750M 1GB; 27in 2560 x 1440 LCD.



PERIPHERALS

WIRELESS ROUTER

Netgear Nighthawk X6 AC3200

★★★★★

SUPPLIER www.netgear.com.au

Designed to keep pace with high-bandwidth content consumption, it is the router King.

SPECIFICATIONS 1GHz dual core processor with 3 offload processors, 6 High performance antennas, one 2.4GHz band and two 5GHz Wi-Fi bands

DESKTOP STORAGE

CalDigit T3 with Thunderbolt 2

★★★★★

SUPPLIER www.amazon.com

The T3 is an expensive RAID device, but when you factor in the drives and the capacity included, it's good value.

SPECIFICATIONS 6/9/12/15TB external hard disk with RAID; Thunderbolt and Thunderbolt 2, 135 x 241 x 116mm 4.5kg.



NAS

Synology Diskstation DS415play

★★★★★

SUPPLIER www.synology.com

For most home users, the DS415play is very impressive. It's an all in one box that can literally do it all.

SPECIFICATIONS 2x4 SATA 3 2.5"/3.5" drive bays • Intel Atom Dual Core 1.6GHz CPU • 1GB DDR3 RAM • 2xUSB 3.0 & 3xUSB 2.0 • 1x Gigabit Ethernet

ALL-IN-ONE PRINTER

Canon Pixma iP 8760

★★★★★

SUPPLIER www.canon.com.au

This Canon can do it all, and at a reasonable price.

SPECIFICATIONS 9600 x 2400dpi print; 2400 x 4800ppi scan; USB 2; 802.11n WLAN; 150-sheet tray

LASER PRINTER

Dell B1160w

★★★★★

SUPPLIER www.dell.com.au

The best all-rounder in our printer grouptest, with excellent text printing and decent costs.

SPECIFICATIONS 1800 x 600dpi resolution; USB 2; Wi-Fi; 150-sheet input trays; 331 x 215 x 178

LAPTOPS


VALUE
Asus TF103C

PRICE \$429

SUPPLIER www.asus.com.au

While ostensibly a tablet with a removable keyboard, it also fits tidily into the value portable category thanks to its immense usability and remarkably low price.

SPECIFICATIONS Quad-core 1.8GHz Intel Atom Z3745; 1GB RAM; 8GB/16GB eMMC storage; 10.1in 1,280 x 800 IPS display; dual-band 802.11n Wi-Fi


PERFORMANCE
Aorus X7

PRICE \$2,999

SUPPLIER www.aorus.com

Super-sleek, light, outrageously powerful and with a spec-list that outclasses many high end desktop systems.

SPECIFICATIONS Q4-3.4GHz i7-4700HQ; 4GB/8GB DDR3L 1600; 4 slots (Max 32GB); 17.3" Full HD 1920x1080; NVIDIA® GTX 765M SLI GDDR5 4GB; mSATA 128GB/256GB; 2xslot 2.5" HDD 500GB/750GB/TB 5400rpm


PROFESSIONAL
Apple Macbook Pro Retina

PRICE \$2,499

SUPPLIER www.apple.com.au

We've selected the 2.9GHz i5 model with 8GB of RAM and a 512GB SSD. Doubling the RAM adds another \$280. Some may find, though, the 13 in screen size to be limiting.

SPECIFICATIONS 2.9GHz Intel Core i5; 8GB RAM; 512GB SSD; 13in 2560 x 1600 LCD; 2 x USB 3; 2 x Thunderbolt 2; dual-band 802.11ac abgn Wi-Fi


ULTRA PORTABLE
Microsoft Surface Pro 3

PRICE \$1,549

SUPPLIER www.microsoft.com.au

Attach the Type Cover 2 and it's as good, if not better, than any 'proper' ultra portable laptop. It took three versions, but Microsoft has nailed this format. At least an i5 is recommended.

SPECIFICATIONS 1.9GHz Intel Core i5-4300U; 12in touchscreen (2160 x 1440); 8GB RAM; 256GB SSD; 802.11ac abgn; Bluetooth 4

HANDHELDS

SMARTPHONE
Samsung Galaxy S6

PRICE \$999

SUPPLIER www.samsung.com.au

If only the best will do, look no further: the Samsung Galaxy S6 is the best smartphone on the market.

SPECIFICATIONS

2.5GHz Qualcomm Snapdragon Octa-core 2.1GHz/1.5GHz ARM Exynos 7420 SoC; ARM Mali-T760 GPU; 3GB RAM; 32/64/128GB storage; 5.1in 4K video; 2,550mAh battery; 1yr RTB warranty; 71x6.8x143mm (WDH) 138g


TABLET
Apple iPad Air 2

PRICE \$539

SUPPLIER
www.apple.com.au

The iPad Air 2 is definitively the best tablet on the market right now, and rightfully replaces its predecessor on our A-List.

SPECIFICATIONS

1.5GHz Apple A8X Soc; 2GB RAM; 16/64/128GB storage; 9.7in 1,536 x 2,048 IPS display; 7,340mAh battery


EBOOK READER
Kindle Paperwhite

PRICE \$199

SUPPLIER
www.amazon.com

The premium Kindle goes the extra mile, with a n attractive de lower weight, swanky page-turn buttons and better contrast.

SPECIFICATIONS 6in 1,072 x 1,448 E Ink Carta display; 2GB storage; single-band 802.11n Wi-Fi; optional 3G; 1yr RTB warranty; 117x9.1x169mm (WDH)


SMARTWATCH
Apple Watch Sport

PRICE \$349

SUPPLIER
www.apple.com.au

This is not only our pick of Apple Watches, but of the smart watch market overall at this point in time. Good features, gr app support and so nice to use.

SPECIFICATIONS

340 x 272 AMOLED; 512MB / 8GB; 205 mAh iOS 8.2+



SOFTWARE

SECURITY
Norton Security 2015

SUPPLIER
www.norton.com/security

Great malware protection and equally good legitimate software recognition

AUDIO
Cubase 7.5

SUPPLIER www.steinberg.net

The addition of better filters solidifies this program's continued place on the A-List.


VIDEO
Sony Vegas Movie Studio HD Platinum 11

SUPPLIER www.sony.com.au

May not have the bells and whistles of other consumer editing packages, but its tools are efficient.


PHOTO
Adobe Photoshop Lightroom 6

SUPPLIER www.adobe.com.au

Lightroom 6 doesn't add up to a revolutionary update, but it improves on what was already an exceptional piece of software.

WEB DEV
Adobe Dreamweaver CS6

SUPPLIER
www.adobe.com.au

This edition makes PHP and CMS its core focus.



The Kitlog

DREAM BUILDS WITH REAL GEAR

It's major overhaul time! Not only are we now comfortable adding 6th-Gen CPUs (Skylake), now that we have solid testing time with 100-series motherboards, but some fresh thinking is needed here to better reflect a wider range of viable options overall.

NEW

Some components offer near-identical performance between brands and models that there's no point recommending one over another. So from now on in Kitlog we aren't recommending any particular brands of memory or hard drives.

Gaming mice are personal, so we're recommending two options here to cover your potential preferences.

The **5th-Gen Z97** platform. It's Skylake time, PC & Tech Authority readers!

Gaming headphone choice. For a budget, both sets are equal in sound quality and comfort. If you can spend a bit more, the Logitech G633 and G933 are outstanding.

Embracing **next-gen SSDs** for the Perfect PC. How you configure our recommendations is up to you (i.e. whether to RAID 1 or 0, or not at all).

OUT

Z97 motherboards, 5th-gen CPUs and DDR3. It's time to shift to the new platform.

Gaming and Perfect PC **sound card**. The onboard audio on our selected motherboards is extremely good and we save a few dollars.

Rapoo V900 mouse. After using this at home for a few months quality control concerns became a big issue, with buttons seizing up and the mouse also failing to register clicks.

A WORD ON VIDEO CARDS

As you would be well aware, there is generally no difference between reference designs. So when we recommend a reference GPU, as we have with the Gaming Box's GTX 970, feel free to choose the best bargain or bundle you can find. In the high-end world of custom designs and factory overclocks, our recommendation is based on effective cooling and quietness, as well as how much of an overclock it comes with out of the box. But again, the GPU is the main point of our selection, so if you have a brand preference, or once again, find a bargain – go for it!

THE GAME BOX

CPU

MOTHERBOARD

MEMORY

VIDEOCARD



INTEL CORE i5 6600K

PRICE \$359

Gaming generally doesn't make use of hyper-threading which makes this the CPU of choice for this box.



ASUS Z170 PRO GAMING

PRICE \$279

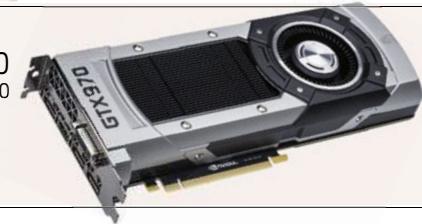
Our Skylake Value Award winner, it packs in a complete set of features yet is priced reasonably. Good audio also means we don't need a sound card.



8GB OF DDR4

PRICE \$120

The speed and brand makes so little difference to performance we can't recommend one over another.



NVIDIA GTX 970

PRICE \$500

Quiet, sips power, but when performance is needed this blazer eats the fat..

THE PERFECT PC

CPU

MOTHERBOARD

MEMORY

VIDEOCARD



INTEL CORE i7 6700K

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MSI GTX 980Ti GAMING 6G

PRICE \$1089

Faster than a Titan X and several hundred dollars cheaper, this is the 980Ti to have right r

TOTAL: \$2851 RIG ONLY: \$1967

COOLER		COOLERMASTER NEPTON 140XL PRICE \$120 Easy to install AIO CPU cooling, relative quiet and performance to rival twin-radiator units.	CASE		BITFENIX RONIN PRICE \$99 Bitfenix continues to deliver great budget cases that look terrific and are easy to build in.
SYSTEMDRIVES		SAMSUNG 850 PRO 512GB PRICE \$365 This SSD offers greatly improved durability. Supplement it with a hard drive of your choice if needed.	KEYBOARD		CORSAIR K70 PRICE \$170 The glorious perfection of mechanical keys with thought-out gamer d
DISPLAY		LG IPS277L PRICE \$499 27 inches of IPS glory. The resolution isn't perfect, but the price is. The thin bezel makes this a very attractive screen.	MOUSE		CM STORM REAPER PRICE \$85 NEW Perfect feel, though a little large and heavy for some tastes, a lighter alternative is the Turtle Beach Grip 300 (\$54)
AUDIO		HYPERCLOUD PRICE \$149 The HyperX Cloud II provide excellent sound quality and not just for the price range. OR CORSAIR VOID PRICE \$130 The USB 7.1 model is the best balance between price and performance.	POWER SUPPLY		COOLER MASTER G750M PRICE \$125 Outstanding value for money, it's powerful enough for even performance PCs packing twin GPUs.

TOTAL: \$8127 RIG ONLY: \$6820

COOLER		CORSAIR H100iGTX WATER COOLER PRICE \$179 Excellent cooling that is easy to install with advanced monitoring.	CASE		ANTEC S10 PRICE \$699 If you absolutely must have what is very nearly the best case we've seen, this is the one.
SSDS		INTEL 750 1.2TB SSD PRICE \$1499 This NVMe SSD is easily the fastest consumer drive we have tested, and by a large margin.	KEYBOARD		CORSAIR VENGEANCE K95 PRICE \$189 The perfect keyboard. Lovely Cherry Red mechanical switches, a slick and attractive aluminium body and customisable backlighting make this The One.
HDDS		ANY HDD PRICE \$100 (2TB) Supplement the SSD with cheap HDD storage.	MOUSE		CM STORM REAPER PRICE \$85 Very solid and feels fantastic under the hand with sweet on-screen movement.
DISPLAY		PHILIPS BDM4065UC 4K 40" PRICE \$1033 It's huge, remarkable value and having one in front of you is PC paradise.	POWER SUPPLY		CORSAIR HX1000I PRICE \$299 Corsair's mighty HX1000i pumps out extremely reliable power, even when under full loads.

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THE BACK SECTION

Real world experience, the newest of the new in tech and some strong opinion

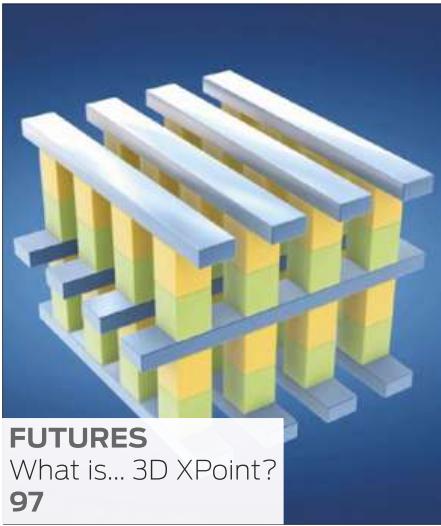
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Microsoft's hybrid attitude **110**



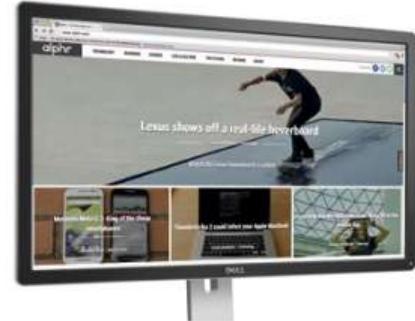
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What is... 3D XPoint? **97**



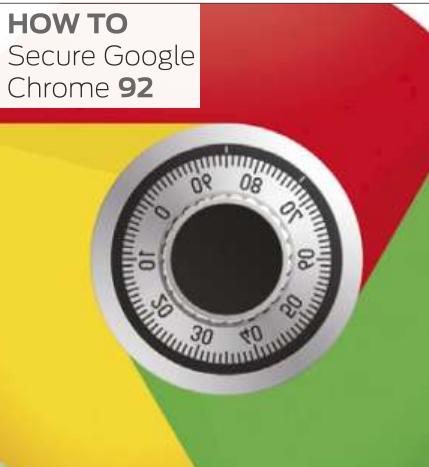
RWC: HONEYBALL

When to make the jump to Win 10



HOW TO

Secure Google Chrome **92**



Create Composite Master Key

G:\KPhappygeek.kdbx

Specify the composite master key, which will be used to encrypt the database.

A composite master key consists of one or more of the following key sources. All sources you specify will be required to open the database. If you lose one source, you will not be able to open the database.

Master password:

Repeat password:

Estimated quality: 41 ch

Key file / provider: (None)

Create a new key file or browse your disks for an existing one. If you have installed a key provider plugin, it is also listed in this combo box.

Windows user account:

This source uses data of the current Windows user. This data does not change when the Windows account password changes.

If the Windows account is lost, it will not be enough to create a new account with the same user name and password. A complete restoring such a backup is not a simple option.

RWC: WINDER

Trusting password managers **108**



RWC: OCKENDEN

Quirky cables



FUTURES

Satellite launching planes, plastic roads and homes that make energy





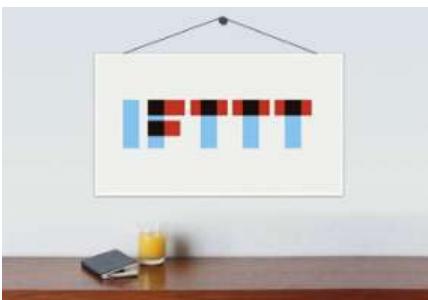
SAVE TIME ONLINE AND AT HOME WITH IFTTT

IFTTT - If This Then That - is a free service that connects together a huge range of devices and systems. **Darien Graham-Smith** discovers how it can make your life easier

We're all connected to a bewildering range of digital services. Family members share their news on Facebook; colleagues set up meetings in Outlook; friends post photos on Instagram and Flickr. Our personal interests lead us to blogs and discussion forums. Keeping up with it all is a real challenge.

IFTTT is a free automation service that helps catch what's important. Using simple "recipes", you can set it to do things such as send you a notification when a particular person posts on Facebook. You can make it automatically add new Outlook events to your Google Calendar, or vice versa. You can get an alert when something you're interested in is mentioned on a blog, or when a particular item is posted for sale on eBay. In short, you can stop trying to keep on top of everything that's happening online – an impossible task – and leave the hard work to IFTTT.

More than 200 services are supported – IFTTT calls them "channels" – with new ones coming online all the time. And as new types of channel appear, so the service's capabilities grow. As we detail overleaf, IFTTT is increasingly hooking into real-world devices as well as virtual services: you can use it to control and interact with a growing range of smart-home technologies, network printers and wearable devices. If you wish, you can get home-security alerts sent to your Google



Glass headset to ensure you don't miss a thing.

Perhaps the best thing about IFTTT is how incredibly easy it is to set up. The website offers hundreds of pre-rolled recipes that you can install and activate with a single click, as we detail below. Or, if you're feeling more ambitious, you can wire up your own custom actions in moments, using the simple condition-trigger logic that gives IFTTT its name.

Recipes can also be triggered by timers as well as online events, so you can use IFTTT to carry out recurrent tasks. And in addition to traditional "IF" recipes, you can create what IFTTT calls "DO" recipes, which you trigger yourself from a smartphone app – see p56 for more details. Although the IFTTT approach focuses on simplicity, it adds up to a powerful and flexible system. No matter what services you're using, there's a good chance that IFTTT can speed up and simplify your online life.

ACTIVATE YOUR FIRST RECIPE

The screenshot shows the IFTTT homepage with a "Featured Recipes" section. It includes three cards: "Read the day's NPR news headlines", "Quickly add tracks to a Spotify playlist", and "Store your listening history in a Google spreadsheet". Below these cards is a "Trigger" button and a "Action" section with fields for "Photo URL" and "Add a tweet".

1 Although IFTTT has apps for Android and Apple devices, the website is the best place to sign up and configure your recipes. To get started, visit ifttt.com and click the "Sign up" button to create an account (you can't miss it – it takes up half of the screen).

Once you've done this you'll find yourself at the welcome screen, where you can browse a variety of recommended recipes. IFTTT users have been creating and sharing these recipes for years, so there are thousands to choose from, and it's very likely that you'll find something useful. If none of the featured recipes takes your fancy, you can use the Search field to look for specific functions. Or, you can create your own recipe – we show you how on the following page.

The screenshot shows the "Trigger" and "Action" steps for a recipe. The "Trigger" step is set to "Profile field to watch" and "Profile Picture". The "Action" step is set to "Update profile picture" and "Add a tweet".

2 Once you've chosen a recipe, you'll be prompted to connect the channels it uses: normally this means entering your passwords to authorise IFTTT to access the relevant services. You can disconnect a channel at any time from the IFTTT website, or you can go into the service itself and revoke IFTTT's authorisation from that end.

You can then review the details of your chosen recipe. We've chosen a recipe that's triggered when your profile picture changes on Facebook, and updates your profile on Twitter to match. Click the Add button at the bottom of the page to add it to your account: it will be active immediately. You can do this with as many recipes as you like; to see all your active recipes (and edit or disable them) click My Recipes at the top of the page.



WALKTHROUGH Create your own recipe

1 If you want to create your own recipe, you'll find the option under My Recipes at the top of the site. As an example, let's make IFTTT send us a text message each time a new episode of our favourite technology podcast is published. The wizard begins by asking which channel to use as the trigger: we'll use the Feed channel to monitor the RSS feed where podcast episodes are announced. You can use the search feature to find it quickly.

2 The Feed channel lets us choose between two different triggers: it can fire every time a new item is posted, or it can activate only when an article matches a specific search term. We want to know about every episode, so we can select the "New feed item" trigger. In the next step we'll be prompted to enter the address of the RSS feed to monitor: for this podcast this is "http://podcast.pcpro.co.uk/?feed=rss2".

3 The next step is to choose an action channel. We've selected the SMS channel: if you haven't already connected this to your IFTTT account, you'll be prompted to confirm your phone number. SMS alerts are free, although if you receive too many in a month they may be temporarily suspended. When your recipe is finished you'll see a summary page like the above. If you're happy, click Create Recipe.

4 All the recipes you activate (whether created by you or someone else) appear under My Recipes, split into IF and DO tabs (see over). The buttons next to each IF recipe let you temporarily disable it, run it right now – IFTTT says that most triggers are checked every 15 minutes – and check its log, so you can keep track of what it's done for you. The last icon (the pencil) lets you edit the recipe's settings.

5 If you choose to edit a recipe, you'll see a page similar to this. Here the Action field shows you a preview of the SMS that will be sent when a new RSS article is posted; you can edit it by typing in text, or inserting "ingredients", which will be passed from the trigger channel. To do this, simply click the beaker icon in the top right of the text field and choose from the available parameters.

6 IFTTT is a sharing platform, so why not publish your new recipe for others to use? To do this, click to edit the recipe, then click Publish. You'll be prompted to give your recipe a snappy name and description – and then it goes live. Later on, you can click on the Published tab under My Recipes to see how many people have installed your recipe, and how many have marked it as a favourite.

Connected personal technology

When IFTTT was founded in 2011, it was primarily used for keeping up with public services. Since then, however, it's gained a second string to its bow, as a system for managing personal devices and services. "Connected home" is now IFTTT's largest channel category, supporting 54 different services and devices.

If you've started to invest in smart technology for your home, this could be IFTTT's killer feature. So far, the market for Internet of Things technologies has been held back by a lack of universal standards: the gadgets you buy for your home can't be relied on to work together.

IFTTT can bridge the gap. For example, if you invest in a Homeboy IP camera, you can use IFTTT to trigger it when your Nest Protect home alarm registers a safety event, so you can capture valuable footage of emergencies in your home,

and monitor them from afar if need be. IFTTT triggers can also include location services from your Android or iOS phone, so you can create location-based actions that trigger switches, lights and so much more.

Another aspect of IFTTT that's grown in recent years is its ability to interface with fitness devices. As with smart-home technology, the industry has been held back by a lack of standards: once again, it's IFTTT to the rescue. Currently, channels from Fitbit, Nike+ and Jawbone support recipes that trigger when you meet your activity and sleep goals on the manufacturers' respective fitness devices.

The Fitbit and UP channels also let you log information such as weight readings into the native app.

The Withings channel, meanwhile, ties into the company's body analytics devices, and lets you record and keep tabs on your pulse,

blood pressure and weight. And for dog lovers, the Whistle channel connects to a smart canine tracker,

which records whether your best friend is getting the right amounts of activity and exercise. ●

AUTOMATION ON THE GO: DO APPS



1 IFTTT's DO recipes add an extra dimension to the service, letting you trigger actions on demand from your mobile device. To use them, you simply need to install one of the IFTTT DO mobile apps, available for Android and iOS.

The simplest of these apps is DO Button. Once you've installed it, you'll be presented with a large selection of pre-rolled recipes that you can add to your profile – or you can browse all the available channels and configure your own recipes. (You can also find and create DO recipes from the IFTTT website, although you need your mobile device to use them.)

DO Button recipes let you trigger simple, recurrent actions – such as sending emails and tweets, recording events or creating calendar entries – by simply tapping the relevant button inside the DO Button app.

For faster access, you can alternatively create a DO widget directly on your Android homescreen, or in the Notification Centre in iOS. On Android it's also possible to activate floating buttons that appear on top of your homescreen and apps, so your DO actions are never more than a tap away.

2 The DO Camera app lets you create multiple camera shortcuts that each do something specific with the images you take. For example, you can launch a recipe that opens the DO Camera and automatically sends each picture you take to a particular Dropbox folder, or uploads the images you capture to a specific Facebook album. If you regularly take pictures for different purposes, it's an effortless way to keep everything organised.

It's also worth mentioning the DO Note app, which does a similar thing with text entry: you can use it to quickly create calendar events, post status updates, add items to a shopping list or even add tracks to a Spotify playlist based on a title and artist search.



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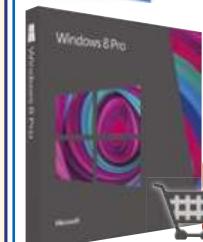


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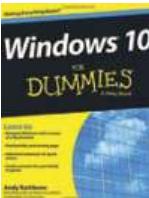
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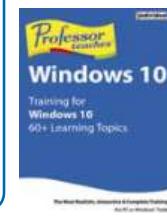
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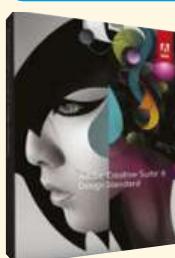
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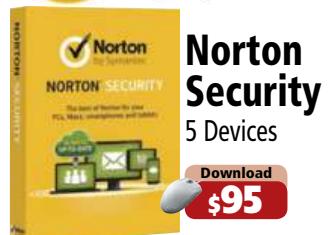
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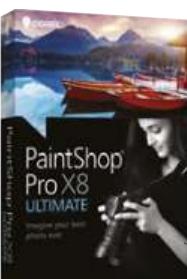


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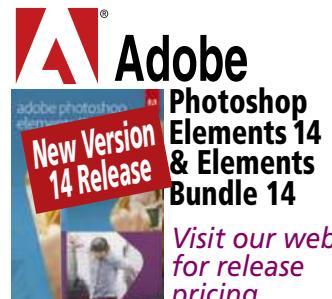
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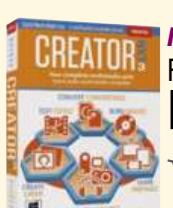
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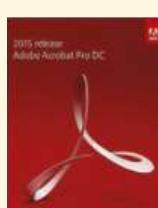
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HOW TO SECURE CHROME

Our resident security expert **Davey Winder** investigates whether Google Chrome really deserves its reputation for hardened security - and shows how to make the browser even safer



Ask a roomful of people to name the most insecure web browser and hands will quickly shoot up. The answer: "Internet Explorer". Ask me to pick the safest, and "Chrome" is the answer on the lips of many. How true is that in reality? It depends on how you measure it. The Secunia Vulnerability Index suggests that known browser vulnerabilities increased from 728 in 2013 to 1,035 in 2014, with most rated as critical. Safari had the fewest, followed by Firefox, Internet Explorer and then Chrome. Secunia also took patch levels into account: the more users have unpatched vulnerabilities, the less safe the browser. Using this metric, Internet Explorer is easily the safest, followed by Chrome, Safari and Firefox. Then by risk exposure (calculated as market share multiplied by unpatched vulnerabilities) and it all changes again, with Firefox at the top, followed by Chrome, Internet Explorer and Safari.

At the last Pwn2Own zero-day hacking contest, Internet Explorer 11 (64-bit with Enhanced Protected Mode enabled) ranked in last place with four vulnerabilities exploited, followed by Mozilla Firefox on three, Apple Safari (64-bit) on two and Google Chrome (64-bit) with just one.

These four different results from just two reports reveal that, while Chrome may be reasonably secure, it's not bulletproof. Let's start by looking at what Chrome does well, and then address how you can improve it.

SANDBOXED STRUCTURE

From the moment Chrome launched, Google made security a priority. The internal sandboxing architecture makes things hard, if not impossible, for those who want to exploit a vulnerability. The HTML rendering and JavaScript execution processes also live in the same box, adding a strong layer of protection. Chrome also tries to stop malicious sites that may infect your computer, by warning you if a site is potentially unsafe. The third prong in Google's security trident is automatic browser updates, which are regularly performed in the background to ensure you always have the most recent – and more secure – version.

It's possible to switch off the warnings, but thankfully this option is in the

browser's Advanced Settings, which will hopefully stop casual tweakers disabling a useful security feature. You will also find the Do Not Track setting here. Despite being the last of the big players to add such a feature, Chrome has caught up and now allows you to disable cross-site user tracking for the purpose of serving adverts. Not all sites respond, but it's a privacy option worth having – as are the Chrome Incognito and Guest features for removing history and cookies when you finish a session.

"Chrome's sandboxing architecture makes things hard, if not impossible, for those who want to exploit a vulnerability"

Guest mode goes furthest, not allowing the user to modify (or even see) the profile of the browser owner.

Extensions can be both a blessing – providing extra features such as the LastPass password manager – and a curse when developers abuse them. They can also inject malware into the browser. Google has attempted to counter this by insisting that all extensions for Windows Chrome users must be hosted in the Chrome Web Store. In the year since the policy was introduced, there has been a 75% drop in support requests for uninstalling unwanted extensions.

The same walled-garden approach is now being rolled out for Mac users, and the Windows developer channel is following suit after some malicious software was found to be forcing users

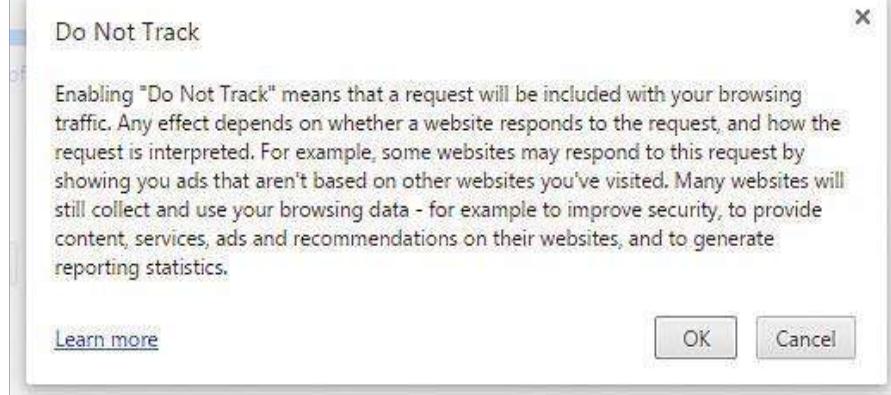
to install off-store extensions.

PASSWORD PROBLEMS

Although security should be seen as a process rather than a product, sometimes a product doesn't help. For example, Chrome can leave your site passwords exposed to anyone who has access to your computer. Of course, you shouldn't leave your computer unattended and accessible to others, but if you forget to press Windows+L before you go for a coffee break, you don't want your web browser making site password retrieval as easy as typing chrome://settings/passwords into the address bar. Do that in Chrome and, if you haven't locked down the client so as not to "offer to save your web passwords", a list of sites and associated passwords appears. The passwords are initially hidden behind asterisks, but only until you click on the entry and hit the Show button to reveal them.

Unlike in other browsers, these stored passwords are not themselves password-protected. You shouldn't let ease of use trump security – don't let Chrome store your logins like this. Instead, install a dedicated password manager such as LastPass, which encrypts your logins and requires a strong master password to access them. Even if someone gets access to your computer, your logins should remain safe if you've opted for a secure master password and two-factor authentication. Chrome doesn't even make it easy to opt out of this insecure password-storage system: the option is tucked away in Advanced Settings, which is at the bottom of the standard Settings screen and requires a further click to access.

Chrome can also synchronise your settings and saved data across multiple



> Do Not Track isn't perfect by any means, but it costs nothing to enable it



Advanced sync settings

Sync everything ▾

<input checked="" type="checkbox"/> Apps	<input checked="" type="checkbox"/> Extensions	<input checked="" type="checkbox"/> Settings
<input checked="" type="checkbox"/> Autofill	<input checked="" type="checkbox"/> History	<input checked="" type="checkbox"/> Themes
<input checked="" type="checkbox"/> Bookmarks	<input checked="" type="checkbox"/> Passwords	<input checked="" type="checkbox"/> Open tabs

Encryption options
For added security, Google Chrome will encrypt your data.

- Encrypt synced passwords with your Google credentials
- All data was encrypted with your Google password as of Apr 29, 2013 [Learn more](#)

[Use default settings](#)

Content settings

Unsandboxed plugin access

- Allow all sites to use a plugin to access your computer
- Ask when a site wants to use a plugin to access your computer (recommended)
- Do not allow any sites to use a plugin to access your computer

[Manage exceptions...](#)

Automatic Downloads

- Allow all sites to download multiple files automatically
- Ask when a site tries to download files automatically after the first file (recommended)
- Do not allow any site to download multiple files automatically

[Manage exceptions...](#)

Let Chrome encrypt everything, including the kitchen sync devices, opening an obvious security risk – especially when all that's required to sync your browser data is your Google account password on a new device. Couple this with a user who saves site passwords in Chrome, and the danger is easy to see. Thankfully, it's also easy to stop. First, follow our advice about not saving site passwords in Chrome. Then add another layer of security by encrypting your synced data with a passphrase that's stored on your computer and isn't transmitted to Google. You'll find this option in the standard settings by clicking the Advanced Sync Settings button and choosing either to encrypt synced passwords or all synced data (go for the latter) with a passphrase of your choice.

If you forget your passphrase, you can reset the sync from your Google Dashboard, which deletes all synced

You don't need autofill, and saving plain-text passwords in your browser is a security no-no

data from the Google servers and disconnects your synced devices. The data on your devices is not wiped, however, so all your bookmarks and preferences will remain for when you re-enable sync with a new passphrase. As yet another layer of security, turn on two-step verification (www.google.com/landing/2step/) to prevent anyone else signing in from an unknown device, even if they have got your Google account password.

Speaking of passwords, along with the LastPass extension, you should install the Google Password Alert extension. This only protects your Google account password, but as this is used for an increasing number of applications and services, it's a worthy addition to your arsenal. It uses a secure thumbnail of your Google account password and compares it with thumbnails of your most recent keystrokes in Chrome, alerting you if your password has been entered into a non-Google site and helping thwart phishing attacks. Initially,

Don't be afraid to adjust the advanced settings researchers were able to bypass the system, but Google fixed this and it now works as expected. It still only operates within the browser when JavaScript is enabled and doesn't protect apps, extensions or incognito tabs unless configured to do so. You can configure this by typing chrome://extensions into the address bar and scrolling down to the Password Alert options. The "allow access to file URLs" tickbox is only of use to web developers.

HARDENED BROWSER

Despite the marketing claims, Google Chrome isn't secure. No web browser is. They all need to be treated with caution and hardened through configuration, extensions and safe browsing practices. Use Chrome as the basis of this browsing ecosystem and you will be off to a good start. Read on for advice on how to secure your Chromebook.

Using two-step verification is a great way to strengthen the security of your Google account

Passwords

Saved passwords

Your saved passwords will appear here. [Learn more](#)

Never saved

Sites which never save passwords will appear here. [Learn more](#)

Done

Passwords and forms

- Enable Autofill to fill out web forms in a single click. [Manage Autofill settings](#)
- Offer to save your web passwords. [Manage passwords](#)

Get Started

Google 2-Step Verification

[Home](#) [Features](#) [Help](#)

Get codes via text message
Google can send verification codes to your cell phone via text message. Your carrier's standard messaging rates may apply.

Want a phone call instead?
Google can call your cell or landline phone with your verification code.

No connection, no problem
The Google Authenticator app for Android, iPhone, or BlackBerry can generate verification codes. It even works when your device has no phone or data connectivity.

Keep your account even more secure
Instead of using verification codes, you can insert a Security Key into your computer's USB port for even more protection against phishing.

Backup phone numbers
Add backup phone numbers so Google has another way to send you verification codes in case your main phone is unavailable.

Backup codes
You can print or download one-time use backup codes for times when your phones are unavailable, such as when you travel.

Register your computers
During sign-in, you can choose not to use 2-Step Verification again on your computer. We'll still ask for codes or Security Key on other computers.

HOW SECURE IS YOUR CHROMEBOOK?

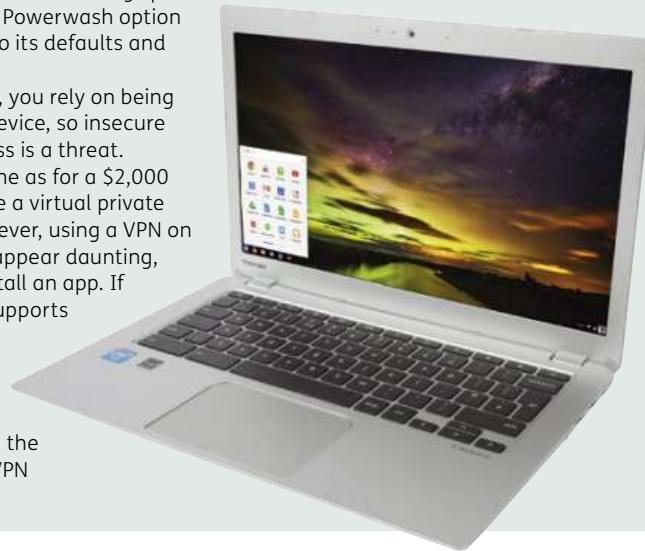
The browser-based Chrome OS negates many of the risks facing the mobile user. Because a Chromebook can't install software, many pundits say that you won't be affected by viruses, Java applets or Flash, or malware attachments in email. However, a Chromebook is not 100% secure.

It's true that software can't be installed, but web apps can. The Google Chrome Web Store keeps most dodgy apps at bay, but "safe" apps have been known to turn rogue and inject ads into web pages or act as spyware.

Chrome OS performs a verified boot at every startup to ensure the OS hasn't been tampered with, and if any signs of this are detected (or if there is any corruption), the system repairs itself to a clean state. There's no Patch Tuesday to worry about or system security upgrades to look out for. Chrome OS automatically updates itself and downloads the necessary files in the background, installing them at your next startup without any user intervention. So, overall, the Chrome OS is pretty secure, but that doesn't mean you can drop your guard.

It's pretty easy to further secure your Chromebook with some quick fettling. Mitigate the web app risk by using Guest mode instead of signing in with Google, as this disables installed apps and prevents the installation of others. Guest mode also erases your session data and downloaded files when you log out. Think of it as Incognito on steroids. Talking of privacy issues, if you lose your Chromebook, your files will remain safe thanks to the built-in encryption, as long as your Google account password isn't compromised. If you wish to sell your Chromebook, use the Settings | Advanced Settings | Powerwash option to reset the device to its defaults and delete all local data.

For the most part, you rely on being online to use your device, so insecure public internet access is a threat. Mitigation is the same as for a \$2,000 Windows laptop: use a virtual private network (VPN). However, using a VPN on a Chromebook can appear daunting, as you can't just install an app. If your VPN provider supports L2TP over IPsec (or OpenVPN with more fiddling), it's straightforward. Here's how to install the Hide My Ass (HMA) VPN on a Chromebook.



1 Open your Chromebook Settings screen and select Add Connection, followed by Add Private Network.

Add private network	
Server hostname:	77.75.123.178
Service name:	VPN London
Provider type:	L2TP/IPSec + Preshared key
Preshared key:	*****
Server CA certificate:	Default
User certificate:	None installed
Username:	[empty]
Password:	[empty]
OTP:	[empty]
Group name:	[empty]
<input type="checkbox"/> Save identity and password	

2 Enter the chosen IP (from those supplied by your VPN provider) into the Server Hostname space and use any Service Name you wish. Select L2TP/IPSec + Preshared Key from the Provider Type dropdown, then enter the preshared key you have been given. Note that while the username you enter is as you'd expect, in the case of HMA the password is the PPTP password, which you'll find in your desktop VPN control panel.



3 Click Connect and, if all is well, you will see the chainlinks appear below the signal strength logo, which shows that you're connected to your VPN.

4 Right-click that logo and, from the Settings screen, select your private network again to reveal a configuration window. From here tick "Automatically connect to this network" if you want to use your VPN connection by default, rather than forgetting to enable it while you're out and about.



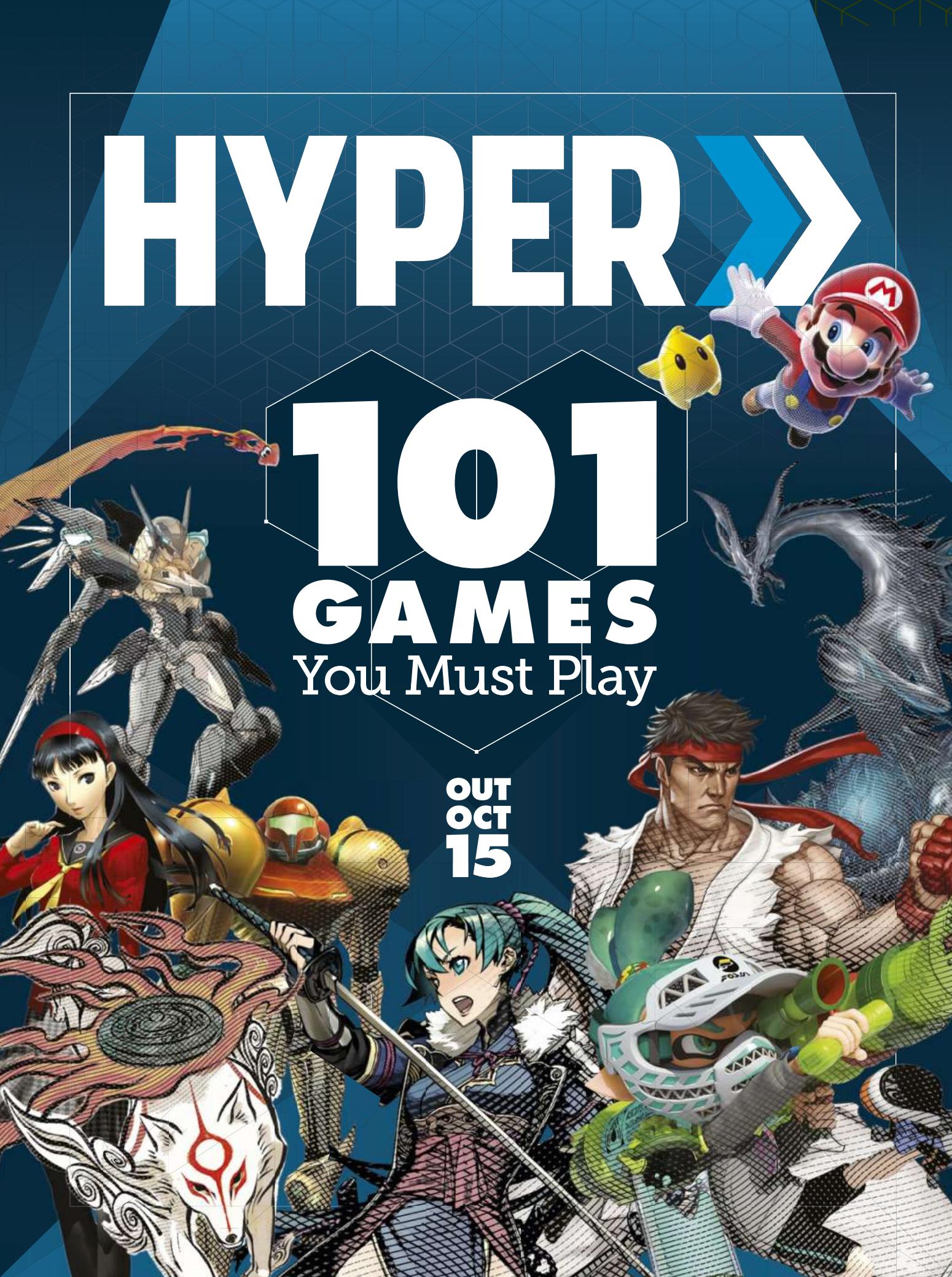
5 To delete a VPN go to Settings | Private Networks | Preferred Networks and hover the pointer over the entry you want to delete until the "x" appears.

HYPER

101 GAMES

You Must Play

OUT
OCT
15





WHAT IS... 3D XPOINT?

Intel and Micron have created a new type of memory, which they claim is 1,000 times faster than flash storage and will arrive on sale next year

What is 3D XPoint and is that really what it's called?

It's not as catchy as flash memory, but it's better than what's in your SSD. Intel says that 3D XPoint, pronounced "cross point", is the first "mainstream" memory technology invented since 1989. The aim is to eliminate the bottleneck between storage and processing. DRAM is fast, but it's expensive and volatile, and wipes when your device loses power. The NAND found in SSDs is cheaper and non-volatile, but can be 1,500 times slower than DRAM. 3D XPoint is 1,000 times faster than NAND – while remaining cheaper than DRAM.

How does it work?

The 3D design packs a lot into a small footprint, allowing every memory cell to be accessed without transistors. 3D XPoint is made of columns, each with a memory cell and a selector that says if a cell can be written or read. Every column

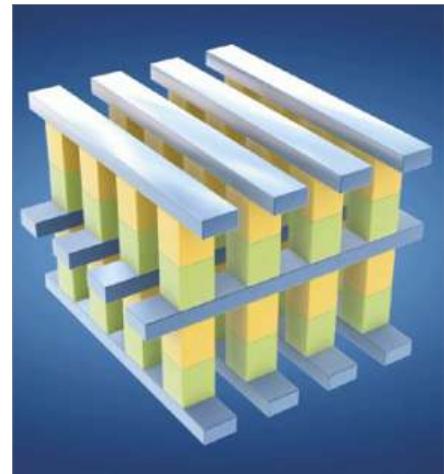
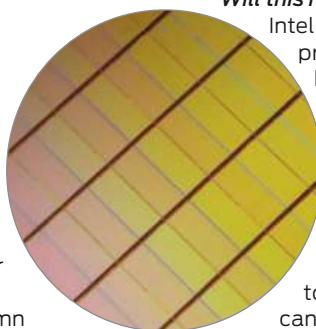
is connected by criss-crossing wires, meaning you can address an individual cell by selecting the top and bottom wire. It's stacked vertically to maximise efficiency, and has ten times the storage density of DRAM. To write to a cell, simply change the voltage of the wires.

So it's better than NAND?

It's faster. NAND's dependence on transistors means data can only be written in blocks. 3D XPoint can address each memory cell with small amounts of data, so it's much faster.

Will this replace PC memory?

Intel doesn't think so, and predicts that 3D XPoint will be used alongside existing technologies, as a "pool" of memory to speed up performance. Programs can move data in advance to 3D XPoint to help it load faster, rather than copy it from an SSD or hard drive to RAM. That means key data can be accessed faster than



before – handy for memory-intensive tasks such as gaming, ultra-high-definition video and "Big Data" analysis. It can also boost boot times, when used to store OS files.

When will 3D XPoint arrive?

It's already being manufactured. Intel and Macron have said that products with the 3D XPoint technology will go on sale next year, but one important detail is missing: the price. We expect 3D XPoint to show up in expensive high-end gaming machines before it filters down to normal laptops.

FUNKY SCIENCE

LARGEST PLANE EVER WILL SEND SATELLITES TO SPACE

Microsoft co-founder Paul Allen and SpaceX's Elon Musk are among the big-name funders behind the Stratolaunch, the largest plane ever built. It will have an epic wingspan of 385ft and six engines, and will take to the skies for testing next year, in the hope of becoming an airborne launching pad for satellites, which will be fired from the Stratolaunch in mid-air.



IS PLASTIC ROAD THE FUTURE OF STREETS?

Tarmac is so old-fashioned. That's according to construction company VolkerWessels, which has created roads made from recycled plastic. Rotterdam is already considering trialling the new road surface, which will last up to three times longer than existing materials, work in a wider range of temperatures, and be quieter and smoother for cars. The roads are easily laid and are hollow, providing space inside for cables and pipes.



THE HOUSE THAT MAKES MORE ENERGY THAN IT USES

Cardiff University researchers have built a three-bedroom house for \$250,000 that will generate \$330 worth of energy for every \$200 it uses, thanks to a roof made of solar panels. These power the heating and electrics, storing excess energy in batteries. The innovation came just as the government dropped its carbon-neutral home goal, with George Osborne saying it was "impossible".



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Apps, essentials, full software, drivers & more!

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- + DRIVER BOOSTER 2 PROFESSIONAL
- + O&O SAFEERASE 7 PROFESSIONAL
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INTERNET

- + VUZE + DROPBOX + GOOGLE CHROME + MOZILLA FIREFOX + MOZILLA THUNDERBIRD + SKYPE + STEAM

LINUX

- + CLONEZILLA LINUX

INSTRUCTIONS: Open Windows Explorer, navigate to your DVD drive and double-click Index.html in the root directory. **DISC**

PROBLEMS: To replace faulty DVDs, please send the discs to: PC&Tech Authority DVD Replacements, Level 5, Building A, 207 Pacific Highway, St Leonards NSW 2065

Make sure to include your name and postal address on the back of the package so that we know where to send the replacements. For all other DVD related issues email cd@pcauthority.com.au. As the delivery platform only, PC&TA and Haymarket Media cannot and will not provide support for any of the software or data contained on these discs. Although all discs are virus scanned, Haymarket Media cannot accept any responsibility for any loss, damage or disruption to your data or computer system that may occur while using the discs, the programs or the data on them. There are no explicit or implied warranties for any of the software products on the discs. Use of these discs is strictly at your own risk.

FULL VERSION



ASHAMPOO PHOTO MAILER

Ashampoo Photo Mailer is a specialist email client which removes all these hassles. There's no need to worry about size limits, the number of photos you're sending or anything else, as the program handles everything for you.

A simple wizard-based interface imports your images with a drag and drop, then displays a simple "new message" dialog. You might need your email account details - server, user name, password - the first time you use the program, but otherwise it's just a matter of entering your recipient's email address, a subject line and maybe some body text.

Ashampoo Photo Mailer then adds up the total size of all your images, and tells you how many emails it'll take to send them all. If you're happy with this, click Next to send them; if you're not, dragging the "Quality" slider reduces the image quality and file size until it hits something more suitable.

The "Address Book" can import your Windows contacts in a couple of clicks, ensuring you won't have to manually re-enter every email address.

By default the emails you send have a signature advertising Photo Mailer, but this isn't hard-coded. Click Settings > Options and you can change it to whatever you like.

REGISTRATION & INSTALLATION:

- Download and run ashampoo_photo_mailer_20379.exe
- After you launch the software, a prompt will be appear requesting you to register.
- Click on "Get free activation key", this will open up a link in your default internet browser.
- Enter your email and hit the "Request full version key".

NOTE: Users who have previously registered an Ashampoo product, please log in.

- Once you have logged in, go back to within the application and click "Request

FREE full version key" again and fill out the prompts accordingly.

- Copy and paste your license key into the application, press next and complete the installation process.

Congratulations! You have unlocked Ashampoo Photo Mailer

For support of this software, please direct your queries to: <https://www.ashampoo.com/en/aud/sup>

REQUIREMENTS:

- Windows XP, Vista, Windows 7, or Windows 8

- 40 MB hard drive space

LIMITATIONS:

- Registration Required.
<http://www.ashampoo.com/>

FULL VERSION



DRIVER BOOSTER 2

IObit's Driver Booster is a simple and straightforward tool which can scan your system for outdated drivers, then download and install and replacements with a click. Upgrade to the Pro version - available here after registration - and you gain additional features such as backup, faster download speeds and wider hardware support.

The program is unusually easy to use. There's no complex interface, no searching around trying to decide what you need to do: just launch Driver Booster, it immediately scans your PC, and a detailed report appears just a few seconds later.

You can then click the "Update" button individually for particular drivers, handy if you want to keep precise control over exactly what's going on.

Or if you're in a hurry, just click "Update All" and Driver Booster will download and launch each update for you.

REGISTRATION & INSTALLATION:

- Download and install driver_booster_setup.exe
- Start and complete the installation

process.

- To register for your serial, point your browser to <http://db2.disc.pcauthority.com.au/>
- Log in or create an account.
- Once you are logged in, scroll down the product page and click on the "Get Serial Code" button. This will display your serial key.
- After the installation process has completed, run the software and you will see a "Activate Now" at the bottom of the user interface. Click "Enter License".

For support of this software, please direct your queries to: <http://www.iobit.com/en/faq.php>

REQUIREMENTS:

- Windows XP, Vista, 7, 8 or 10
- 30 MB hard drive space

LIMITATIONS:

- Registration Required

Website:

<http://www.iobit.com/>

FULL VERSION



O&O SAFEERASE 7

Thankfully, O&O SafeErase Professional is designed to give you an option for ensuring data you want deleted really does get deleted beyond the point of no return. At its most basic level, O&O SafeErase can wipe files with zeroes or employ a number of more thorough, secure (and slower) methods recognised by such luminaries at the US Department of Defense to ensure files deleted from your computer can't be recovered by you or anyone else.

REGISTRATION & INSTALLATION:

- Start and complete the installation process. For 64bit users, please download and install OOSafeErase7Professional64Enu
- To register for your serial, point your browser to <http://safeerase7.disc.pcauthority.com.au/>
- Log in or create an account.
- Once you are logged in, scroll down the product page and click on the "Get Serial Code" button. This will display your serial key.
- After the installation process has completed, you will be prompted to enter your serial key. Paste the serial key and complete the registration process.

For support of this software, please

direct your queries to: <http://www.oo-software.com/en/support>

REQUIREMENTS:

- Windows XP, Vista, Windows 7, or Windows 8
- 50 MB hard drive space

LIMITATIONS:

- Registration Required

Website:

<http://www.oo-software.com/en/>

FULL VERSION



WASHANDGO 2015

WashAndGo 2015 can help reclaim lost storage space, restoring your system's original performance and stability. And not just by the usual basic steps, like emptying the Recycle Bin and clearing your browsing history. Instead the program uses a deep knowledge of Windows and hundreds of applications to locate every surplus file and Registry key, giving your system the most thorough clean you'll find anywhere.

WashAndGo 2015 analyses your system and reports on the results. This starts with the obvious junk, the Recycle Bin, crash dumps and temporary files. But our test

PC also had leftover files and Registry keys from Adobe Reader, IrfanView, iTunes, Word, Skype, uTorrent and VLC Media Player, as well as many megabytes of forgotten *.OLD and *.TMP files.

REGISTRATION & INSTALLATION:

- Download and install WashAndGo_cs_uk_11_2015.exe
- Get your registration code within the program. Note if you've previously registered any Abelssoft full product, you won't need to register again.

Support queries to: <http://www.abelssoft.net/contact>

REQUIREMENTS:

- Windows XP, Vista, Windows 7, or Windows 8
- 100 MB hard drive space

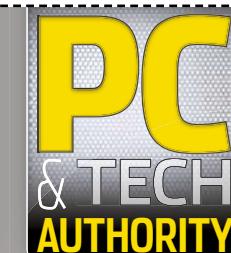
LIMITATIONS:

- Registration Required

Website:

<http://www.abelssoft.net/>

FREE FULL VERSIONS: Each month, we offer PC & Tech Authority readers full registrable versions of some software on the DVD. See the installation instructions in the DVD menu to complete registration, if applicable. **IMPORTANT:** Full product registration closes on 09/11/15



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FEATURE + ASHAMPOO PHOTO MAILER + DRIVER BOOSTER 2 PROFESSIONAL+ O&O SAFEERASE 7 PROFESSIONAL + WASHANDGO 2015 **DRIVERS** + ATI CATALYST + NVIDIA FORCEWARE **HELP** + DISCLAIMER + DAMAGED OR FAULTY DVDS + USING THIS DVD + INSTALLING SOFTWARE **EDITORIAL** + BURNING AN ISO IMAGE + PC&TA EDITORIALS **TROUBLESHOOTING** + SERIAL CODES + BLANK REGISTRATION WEBSITE + CAN'T FIND A FILE? + INSTALLATION ERROR **WINDOWS** + CCLEANER + CLASSIC SHELL + CUTEPDF + DEFRAGGLER + FOXIT READER + GREENSHOT + APPLE ITUNES + LIBRE OFFICE + OPEN OFFICE + MALWAREBYTES' A/M + SANDBOXIE + VLC MEDIA PLAYER + FLUX + 7ZIP **MAC** + ALFRED + BETTERTOUCHTOOLS + APPLE ITUNES + DROPBOX + FLUX + GOOGLE CHROME + MOZILLA FIREFOX + PLEX + SKYPE + TEAMVIEWER + VLC **INTERNET** + VUZE + DROPBOX + GOOGLE CHROME + MOZILLA FIREFOX + MOZILLA THUNDERBIRD + SKYPE + STEAM **LINUX** + CLONEZILLA LINUX

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Make sure to include your name and postal address on the back of the package so that we know where to send the replacements. For all other DVD related issues email cd@pcauthority.com.au. As the delivery platform only, PC&TA and Haymarket Media cannot and will not provide support for any of the software or data contained on these discs. Although all discs are virus scanned, Haymarket Media cannot accept any responsibility for any loss, damage or disruption to your data or computer system that may occur while using the discs, the programs or the data on them. There are no explicit or implied warranties for any of the software products on the discs. Use of these discs is strictly at your own risk.



JON HONEYBALL

"MICROSOFT HAS TO GET ITS USERBASE ONTO WINDOWS 10 TO REDUCE CUSTOMERS' DEPENDENCE ON PREVIOUS VERSIONS"

Upgrading to Windows 10 allows you to tiptoe around the smoking crater of Windows 8, but give it a few months before taking the leap

It's finally happened! It's here! Fire up the marching band and get the party started! Windows 10 has shipped. Or rather, if some reports on Twitter are to be believed, it's "escaped". Without doubt, some users are having problems: I recently read about disk configurations getting so scrambled that you end up with an unreadable volume and all your data disappearing – something of an "oops". Other people are reporting problems with multiple-monitor setups, many of which appear to recover after a reboot. There have also been some, to be kind, "suboptimal" driver releases.

All of this was to be expected. Anyone who installs a new OS on day one could definitely be described as displaying an abnormal degree of bravery. Microsoft knows this and has staggered its launch upgrade sequence to customers accordingly. Not everyone gets access to the update on day one, and nor should they. Throttling the deployment is a wise move that confines the initial round of problems to those who've proved most dedicated to the product over the past few months, as part of the Insider Programme. This makes it easy to say that anyone having problems has only themselves to blame, which, while perhaps true, is somewhat glib.

After all, there are two sorts of people in the world – those who have suffered a major data loss and learned from it, and those who haven't – yet. Do we really, in 2015, need to have a conversation about how your computer blowing up, a catastrophic hard disk failure, loss of power supply, the OS imploding or leaving your laptop on the back seat of a taxi isn't the end of the world? There's

more than enough good technology to keep your data safe: from cloud-based solutions such as Dropbox or OneDrive to full image-recovery tools. If you don't use them, you only have yourself to blame.

Nevertheless, I've already had numerous people asking me in my local pub whether or not they should upgrade to Windows 10. My answer to all of them has been a resounding "no!" That doesn't mean they shouldn't ever upgrade, just not yet. The initial rollout of a major OS upgrade always, but always, throws up problems that either weren't encountered during testing, or were deemed to be of lower priority than meeting the release deadline. It happens time and time again, and there's no reason why it would be different for Windows 10.

The free upgrade window for eligible users is a year, so there's no need to rush to claim the offer. Take a month or two to see how the keen kiddies get on, before making sure you're ready to take the leap. That involves checking that your full system recovery works and that a complete disaster isn't going to bring you out in an unwelcome sweat. As for myself, I've upgraded some test virtual machines, including a Toshiba Ultrabook that I don't particularly like and for which I'll shed no tears if it croaks and fails. I like what I see in Windows 10, but it's certainly true that a lot of things came together very much at the eleventh hour

✓ Meraki devices bring new capabilities to a bigger range of users

(more like 11.30pm, actually). It's the things that happened at 11.55pm that are the real worry, as late drops are always fraught with difficulty.

So I'm just letting the world take a few turns and will wait a month or so. If you want an in-depth analysis of the size of the new Start menu buttons, you've come to the wrong place. However, don't mistake this initial hesitancy for indecision about eventually upgrading: Windows 10 has to work to become a success. Microsoft has to get its userbase onto Windows 10 to reduce customers' dependence on previous versions.

Windows 7 is a strong OS that's still being sold on new computers – which is fine if you need it, but I would be pushing for hardware equipped with Windows 7 to be phased out. Everything you liked about Windows 7 is still there in Windows 10, so you can move forward and tiptoe around the smoking crater that was Windows 8. Timescale for upgrading? My recommendation is simple: get it within a year on all devices.

Here's why. I think that Microsoft has missed a real opportunity with Windows 10. I fully understand that it wants to get everyone onboard as soon as possible, which means accepting that an awful lot of baggage will be carried over. This is a good thing because, like it or not, baggage is what makes the computing world go round – users have favourite apps, companies have infrastructure, and hardware needs device drivers.

That said, I can't help but think that Microsoft has missed the opportunity



JON HONEYBALL

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✉ @jonhoneyball





to put a really rock-hard Windows 10 certification programme in place. It could help users identify not only bad code, but also newer versions or updates. After all, the problem for Microsoft isn't just that users stick to older OS versions such as Windows 7 and XP, but that they also hang on to older apps and don't update them as quickly as they could or should. Of course, it's not easy to persuade someone to hand over cash for a newer version of an application, when all they want is stability, not extra functionality.

I also have a special place in hell reserved for the printer vendors who won't sort out their device installations for Windows 10. Placing a firmware upgrader on your website, hidden deep below the Serbo-Croat recipe-writing add-on for your scanner software, isn't helpful. Most printers these days connect via IP and therefore should be able, at the very least, to tell me that new firmware is available. Even better, a modern printer should download and install the wretched thing itself. Discovering that out-of-date printer firmware is the root of all my printing problems is not a good way of getting me to buy your products.

GHOSTERY AND AD-BLOCKING

This is a difficult subject because PC Pro is a commercial venture and, if there's no money being made, the doors will close. However, I'm getting heartily annoyed with websites filling my downloads with all sorts of tracking, marketing and advertising claptrap. In some cases, this can run to multiple items of code. For example, one motoring website I visit has code injected from AddThis, Flashtalking, Lotame, RadiumOne and Tealium. The Guardian website has AudienceScience, DoubleClick and ScorecardResearch

Beacon. The Telegraph website uses Adobe Tag Manager, Chartbeat, Disqus, Google Analytics, NetRatings SiteCensus, Optimizely, Quantcast, Qubit OpenTag, ScorecardResearch Beacon, Skimlinks and Webtrends. How many of those have you heard of? Are you happy for them to

"Providing content as HTML-encoded text on a free website would be an absolute disaster"

trundle away in the background, taking note of whatever's going on within your browsing experience?

Then there's the advertising junk. I understand that, without these annoying bits and pieces, there's no money and no money means no site. But the era of simple banners and non-invasive advertising has passed. Now we have pop-ups, pop-unders, banners and things that make us wait five seconds before eventually taking us to our intended destination. Or, you have to click to get rid of them, which is sometimes damn hard to do on a particularly small smartphone screen.

To be blunt, I've had enough. I don't want my browsing flooded with this stuff, and don't accept that I should be tracked, tagged or monitored without my consent either. So I'm officially withdrawing my consent. There are tools out there such as AdBlock and the fascinating Ghostery, which lets me see and block all hidden tracking technologies. Since I've applied these remedies, my browsing has been far snappier. I use less data when on my mobile phone, and pages appear, with

< Getting rid of pop-ups, pop-unders and banners can be difficult, especially on a smartphone

the desired content, in a fraction of the time it used to take.

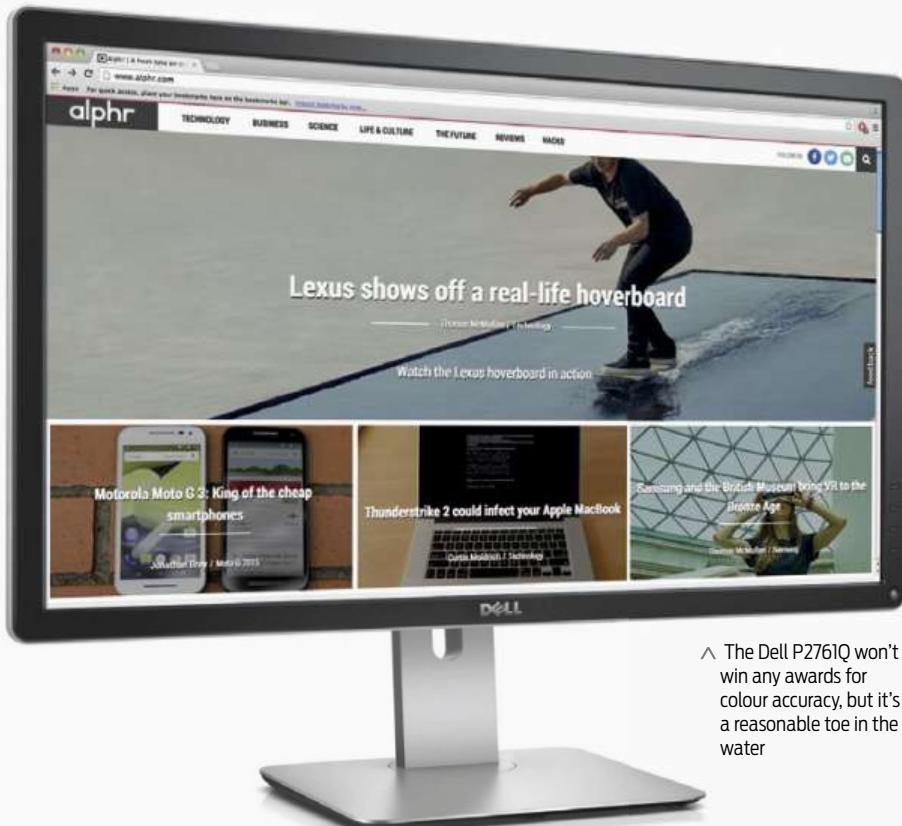
The problem is that this isn't a model that can work for the future. The last thing the industry needs is open warfare with its customers. In the interests of supporting commerce, I can live with a few of these things, but when the list grows as long as on the Telegraph's site, it's getting out of hand. This on a website that only offers a limited number of page views per month for free, before you get locked out and have to subscribe to their annoying payroll.

The problem is that good material is expensive. Providing content as HTML-encoded text on a free website would be an absolute disaster, because it leaves no obvious way of making any money. The industry has, therefore, slid down a path of adding advertising and tracking data to gain both direct income from, and insight into, its readers. In doing so, it's arguable that they're killing the golden goose – the positive relationship between the reader and supplier.

Maybe the answer is to generate personalised PDF files on the fly, or a similar technology that can deliver content without all of these coding dregs surrounding it. Otherwise, we run the risk of more solutions like Apple News, which aggregate content and may inject their own adverts into the stream anyway. More and more sites are treading the fine line between remaining acceptable to users and annoying them so they leave forever. In my opinion, I think it's worth looking at tools such as Ghostery. Understanding what's happening on a particular site is a good education, and may well explain the grotesquely long loading times and huge data transfers when you're only doing simple, benign browsing to begin with.

4K AND OS X

I've decided to make the leap up to a 4K monitor for my Mac Pro, replacing one of its two Thunderbolt displays. I initially wanted to buy something really good such as a high-end Eizo, given the long and sterling service I've had from my Eizo 30in monitor, but the market seems to be moving too fast. Too many vendors are promising displays that curiously don't ever seem to come to market, or whose price unsettlingly varies from week to week. I took the plunge by buying a relatively low-end Dell device, the P2761Q 27in Ultra HD 4K LCD monitor. It runs to 3,840 x 2,160 pixels, has a moderate 350cd/m² brightness, and offers both DisplayPort and HDMI inputs. At a little



^ The Dell P2761Q won't win any awards for colour accuracy, but it's a reasonable toe in the water

over \$1000, this unit seemed to be a reasonable toe in the water.

So far I've been quite impressed by the Dell. It isn't going to win any awards for colour accuracy, but I have colour-calibration tools in the lab to sort that out. It's not the brightest screen either, but it's adequate. Getting it to work with the Mac Pro was simply a matter of making sure I was on a recent version of OS X, because significant changes happened in the support of 4K monitors around April this year. OS X doesn't mind simultaneously running one screen at one resolution and DPI, and another with different settings. Some apps can get a little upset, including VMware Fusion, but this will be fixed in an upcoming build. Furthermore, putting Windows 10 into a VM and then running it on the 4K monitor could end up with Windows getting rightfully confused about what was going on, although a few tweaks sorted that particular issue out.

Overall, it's worth taking a look at these high-resolution monitors, which are far sharper than standard HD and easier on the eyes over a long day. I wish Apple would release a nice 27in 5K monitor to go alongside the 5K iMac, but there's still no sign of that happening.

MERAKI

My adventures in the land of Meraki continue apace. I now have all four of

our sites using Meraki firewalls and Wi-Fi units. I've managed to set up a full-scale, pan-site VPN tunnel that allows anyone to connect to anything on another site. This lets me do all sorts of new things. For example, I have a NAS box on one remote site, which I update with core data from the main lab. I do this over a standard IP link, using the rather excellent Sync Folders Pro tool for OS X. I needed to update the firmware on a colour laser last week, and could do it from my desktop without having to drive down to the site. This has been possible for years, of course, but the way that Meraki configures and manages is so simple that it brings this capability to a much lower-end range of users.

I've also recently been working with my friends Jason and Tim at bridgesolutions.com, who are writing cloud-based

✓ The initial rollout of a major OS always throws up problems, so there's no need to rush



ions to leverage the amazing nation Meraki can collect. Once, the Wi-Fi unit in the main lab more than 2,000 separate devices yesterday. These were devices in immediate neighbourhood and undoubtedly included a raft of devices in people's cars as they drove past. Meraki collects all of this data, and you can mine it to your heart's content. For example, they've written a solution that tracks people moving in and out of a shop, so that you can make them special if they come back next week. The customer doesn't even have to be logged in to be tracked, as just the normal Wi-Fi signal of a mobile phone is trackable, anonymously. If the customer logs into the shop's Wi-Fi, you can then start interacting with them.

A sort of data analytics is possible thanks to how the Meraki system collects data. You can disable this if you want, but it's an invaluable tool for a lot of shops, restaurants, petrol stations and other public places. This takes me back to my previous remarks about web-browser tracking: if you don't want to be visible to these systems, just turn off your Wi-Fi and Bluetooth! It's up to us to decide whether we're being tracked or not. Unfortunately, this is getting all too complicated. I normally go into a shop to buy something, so having special offers made available to me isn't such a bad thing.

Some reason, it just doesn't feel the same as going to a website and being bombarded by adverts and tracking. It's strange how we feel differently about these things, depending on the context.

MICROSOFT CLUTTER

You might have noticed a new item called Clutter in your Outlook and Office 365 setups. This is a system that cleverly analyses what you're doing, what matters to you and to which emails you usually respond, and then automatically moves unimportant things into your Clutter folder. I don't like this sort of processing being done by default, because it's a change to my "world order". It would be far better for them to send me an email about this new feature, and ask whether I would like to try it for a fortnight. However, I have no problem with Windows 10 doing system updates without permission; far too many systems don't get updated because their user doesn't want them to interrupt their day. Moreover, Windows Update has been a real chore in the past, taking far too long and being a real pain. Hopefully Windows 10's auto-updating will be more sophisticated; otherwise users will just turn it off and we'll sadly be back to square one. ●

PAUL OCKENDEN

"THE OLD JOKE ABOUT USB RUNS: 'WHICH WAY ROUND DOES THE PLUG GO? THE OTHER WAY, OF COURSE'"

Three quirky USB products have been surprisingly useful, from a reversible cable to a 5m-long endoscope

Last month I looked at three interesting USB gadgets and, as promised, I'm going to examine three more in this column. I'm looking at some of the more unusual, esoteric and downright useful USB gadgets that I've bought or had sent to me for testing over the past few months. I'm going to start with a very novel cable – in fact, it's unique. The old joke about USB runs: "Which way round does the plug go? The other way, of course." I know the odds are mathematically 50:50, but it seems that a USB lead is always upside down when you first go to plug it in.

Of course, this "wrong-way-up-ness" (I'm sure there's a technical term) isn't anything new. From the serial, parallel and SCSI connectors of old to the network, power and display sockets we use today, all cables have suffered from the problem. Ports hidden behind bits of kit somehow further increase the chances of wrong-way-up-ness. Some of the newer connectors such as USB Type-C and Apple's Lightning are symmetric and can be connected either way round, but most of us are stuck with old-fashioned USB (full-sized and micro) for the foreseeable future. And these are definitely "one way only" connectors – or so I thought.

Then I came across a video announcing a new crowdfunded cable and began to realise that things could be different. I probably paid more attention to the video than the product at first, as it's one of the best product introduction videos I've ever seen. In fact, have a quick gander at tinyurl.com/pve5cce now, and then come back to this column when you're done watching it.

As you've just seen, the product is a USB cable called MicFlip, which has fully reversible USB and micro-USB ends. At least, that was the initial promise, but

there's a twist to the tale. The cable comes from WinnerGear, a company I greatly respect – its Montar car mount is probably one of the best phone holders on the market. If you've never come across this item, it's a beautifully made, sturdy mount far better than the cheap tat you normally find in "car kit" accessory packs. It fits all phones – from the smallest "ladyphone" to monsters such as the various Galaxy Notes and the iPhone 6 Plus. Best of all is its suction mount, which isn't the usual black rubber "lick it and stick it" type. No, this sucker is made of a gel-like material that lets it stick to textured surfaces such as a car dashboard, and comes with a 3M adhesive pad you can use if the surface is breathable.

It's a brilliantly thought-out and designed product, which is why I had such high hopes for the MicFlip cable and decided to get in touch with the company. The crowdfunding campaign

on Indiegogo had only just started, but WinnerGear was very accommodating. It only had a single sample of the lead available – the one used in the video – but sent it to me. The only one in existence. This makes us the first magazine in the world to test it, and it worked very well on every device. It's great not having to worry about which way round the connectors are when plugging in. It's a good-quality lead, too, with tangle-free construction, aluminium housings and gold-plated connectors, making it feel like a well-made, premium product.

Purists might complain that the device works by "abusing" the specification of the plugs themselves. USB and micro-USB are supposed to be a particular size and only have connectors on one side, according to the USB Implementers Forum Inc (a not-for-profit company founded by the companies that originally developed the USB). You can only insert them into "official" plugs and sockets



PAUL OCKENDEN

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MicFlip By WinnerGear : World's First Reversible Micro USB Cable

WinnerGear

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20,708

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I really liked the video WinnerGear produced to promote its MicFlip reversible USB cable

when they're the right way round. The micro-USB connector is supposed to have a long and short edge, but the MicFlip plug has two short edges instead. You'd think this wouldn't fit into your phone or other device properly, but I'm happy to report that this isn't the case. It fits together very well, the connectors swap round when the orientation is reversed, and everything simply works as it should.

However, I mentioned a twist to the tale. It's great that WinnerGear sent me their only working cable, but we are not only the first magazine in the world to test it – it's the only magazine that ever will. Why? Despite my sample appearing to work fine, WinnerGear has struggled to get the production leads to work reliably. The micro-USB end is fine, but there have been disconnection problems at the main USB end and, as a result, the company is now shipping a version that's reversible only at the smaller end. That won't matter for most people, as the larger end will remain permanently connected to a PC or a charger, but the late-in-the-day change has upset a few of its crowdfunding backers.

I can understand their anger. The MicFlip would have been unique as an entirely flippable cable, while there are already other products and crowdfunded projects on the market that rotate just the micro-USB end. Check out Micro-Flip on Kickstarter or, if you don't mind ordering from China, you'll find the Prolink Dual

Face cable for sale on banggood.com for less than \$5. However, the MicFlip is a much nicer cable. It's obviously more expensive at \$30, but I reckon it's worth the extra money. I'm really hoping that WinnerGear will manage to solve the problem of making both ends reversible, forcing them to make another brilliant video for us!

GETTING A FIX

A few years ago, a chap who lived down the road and knew I was "into computers" would knock on my door every few weeks to demand that I pop round to sort out his PC. I'd leave it working perfectly every time, but, within as little as a fortnight, his machine would grind to a halt again under the weight of trojans, toolbars and other dodgy threats. It kept happening, despite him running current antivirus software. I shudder to think what sort of websites he used to visit or what software he'd installed to pick up so much malware in such a short space of time. I was never actually brave enough to look through his internet history!

He was also one of those people who can't take a hint. I started to gently suggest that my trips were becoming too frequent and that, if he insisted on visiting dodgy websites and installing spurious codecs to view videos, perhaps he could find someone else to look after his PC for him. I even tried wearing my very rude "No, I won't fix your f***ing computer!" T-shirt for a visit, but he still kept ringing the doorbell. I even tried pretending I wasn't in if I knew it was him. I eventually solved the problem by moving house.

Okay, I admit that I didn't move solely to get away from this chap, but it was a very welcome side effect.

I've recently been sent a USB-based gadget that, had it been around then, might have saved all of those trips along the road. It's a clever little device called the FixMeStick. Readers with

"His machine would grind to a halt again under the weight of trojans, toolbars and other dodgy threats"

exceptionally long memories might remember that I once wrote about a product called the Yoggie Gatekeeper Pro (tinyurl.com/nrdb78o), an ExpressCard that also came in a near-identical USB version called the Gatekeeper Pico. The device contained its own operating system and would do real-time virus scanning of all the data that arrived on your PC while it was running, using a Kaspersky scanner engine. However, it was way ahead of its time and, unfortunately, Yoggie went out of business back in 2010. The FixMeStick is similar in some respects: it's a USB device that contains not only a Kaspersky engine but also Sophos and Vipre scanners – meaning that all of your files are checked three times.

However, unlike the Yoggie device, it doesn't work in real-time or check data as it arrives from the internet, but is more of a traditional file-scanning product. You use it to get out of trouble if your PC has become infected. Like the Yoggie device, the FixMeStick contains a Linux operating system, but uses the OS to reboot your PC, rather than running it alongside the host PC. To use the device, you plug it into your PC like a USB memory stick, run an executable on the device to download the latest definitions for the three onboard scanning engines, reboot the machine and start up a Linux-based operating system session. At this point it connects to the internet and tries to update the Linux build used on the device, as well as its various drivers.

This isn't an essential step, and in some instances – if you're on a protected network or using a mobile SIM-based data connection – the update won't be possible. That's not the end of the world, but driver updates ensure that the device can operate as quickly as possible. After performing these updates, it scans your PC and checks all drives, files and folders. On one machine I scanned recently, it

found a Registry hack deeply embedded in an old recovery partition. The scanning process is completely independent of your machine's main operating system, meaning you can be sure there aren't any hidden processes hijacking access to certain files or masking malware.

The process can take a while, depending upon how much data you have on your machine and the speed of your drives. A dialog pops up to say "This might take between one and several hours", which made me laugh. It's accurate though. If one of the three scanning engines finds something nasty, it gives you the usual option of moving the files to quarantine. None of the options are particularly complicated, meaning there's no "what level of scanning do you want" or "what type of files do you want to exclude" – it just scans everything. This lack of complication makes the product perfect for the type of person who is likely to end up with an infected machine; that's probably unfair, though, as we've all picked up a virus from time to time. I'm still thinking of the man along the road!

There are two versions of the FixMeStick – a standard one for around \$90, which is licensed to scan up to three PCs per month, and a Pro version for about \$400 that will work with an unlimited number of machines. The latter might be useful for an IT department, or perhaps "PC Doctor"-type operators. You get free updates for a year with each version, with renewals available later on. Incidentally, people often say that Macs don't get viruses, but that's simply no longer the case. There may not be

< The FixMeStick is great for rescuing virus-, trojan- or rootkit-infected PCs, and there's even a version for Macs

as many Mac viruses as you would find with Windows, but they certainly exist, so it's lucky the FixMeStick is also available for OS X. It can't cope if you're using BitLocker or (the now defunct) TrueCrypt to protect your drives, but if you're savvy enough to be using drive encryption then you're probably not in the target audience for this device. It's more something that you might buy as a present for your dad – or perhaps suggest to that bloke along the road.

CAREFUL WHERE YOU STICK THAT CAMERA

My final USB gadget is something I bought out of curiosity, but for which I've since discovered a host of uses: an endoscope. Let's get the jokes out of the way quickly. No, I'm not going to stick it down or up any of my bodily orifices. Hopefully the readers of this column aren't like the majority of my friends, from whom I've had nothing but giggles, sniggers and titters when I tell them what I've bought.

I'm sure proper medical endoscopes cost many tens of thousands of pounds, but my device cost just over \$12 on Amazon. It's basically a tiny camera on the end of a long (5m) cable, with LED illumination at the tip so you can use it to inspect dark places (stop tittering at the back!). Various "inspection camera" or "snake camera" devices have been on the market for a while, but they're mostly expensive and usually came as self-contained units with battery pack, screen and so on. As a USB device, this cheap Chinese endoscope from Amazon simply plugs into any PC and, better still, if you use an OTG cable, into a phone or tablet.

Its image resolution is hardly spectacular, at 680 x 480 pixels. In a world where smartphones are starting to sport 4K screens, a 0.3-megapixel image sensor might sound laughable, but it's

> Proper medical endoscopes cost many thousands of pounds, but my device cost just over \$12 on Amazon

"I'm amazed at just how useful the endoscope has been, especially when used with an OTG cable and a smartphone"

more than adequate for the kind of things you will be using it for.

There's some Windows software supplied with the device, but it seems to work with any application that expects a USB camera feed, such as Windows Movie Maker or most webcam software. On Android, just search Google Play for "USB Camera" and you'll find a plethora of suitable apps. The camera end of the endoscope is fully waterproof, and its focal length lies in the 70-100mm range, which is ideal for a device like this.

So what can you use it for? Well, since I've had mine, I've used it to peer down a plughole to see if a lost ring was trapped in the U-bend; I've looked into the gap in a cavity wall to see where various electrical cables run; I've attached it to a long pole to check the gutters, and I've used it to look at the wiring behind the dashboard in my car, without having to disassemble everything. I'm amazed at just how useful the endoscope has been, and I don't recall that any of these applications involved attaching it to a PC. The device is so much more convenient when used with an OTG cable and a smartphone. However, the device is definitely not suitable for medical examinations, which eliminates a worry I once experienced after being taken to hospital for a "both ends" endoscopy inspection: "I really hope they do the top first..." ●



ROBERT SCHIFREEN

"WE RAPIDLY DISCOVERED THAT SHAREPOINT ISN'T SO MUCH A PRODUCT AS A DEVELOPMENT PLATFORM"

It took four years, but a university's SharePoint installation now provides essential features for its 3,000 staff

Six years ago, a university I'm connected with set out to create a web-based portal for its 3,000 staff. The powers that be made two crucial decisions: that Microsoft SharePoint was the way to go, and to use the unreleased 2010 version, rather than the 2007 flavour. I took up the new SharePoint farm administrator post in June 2011, and spent the next two weeks on the sofa with lots of strong coffee and a copy of SharePoint Unleashed – still the best series of books on the subject. After another week at Learning Tree's training centre, we were ready to start building test farms.

Microsoft is pretty poor at getting people to understand what SharePoint actually is. The official line is that it's a collaboration platform, but so is Twitter. I look at it like this: SharePoint lets you create websites, allowing people to upload and share information. It can be documents, images, calendars, traditional web pages, structured data you might find in databases or spreadsheets, or just about anything else. SharePoint works with Active Directory, meaning you can set permissions on anything from an entire document folder to a single record in a contacts list. It's incredibly powerful.

As we rapidly discovered when we started building the system, SharePoint isn't so much a product as a development platform. While it's relatively capable of doing out-of-the-box stuff, building a working system and setting it up properly is either a multi-week task or one that requires assistance from expensive consultants. Frequently, it's both. However, if the naked product can't



ROBERT SCHIERFEN

ROBERT SCHIFREEN
Despite everything, Robert Schifreen remains SharePoint farm administrator at the University of Brighton

manage a task, hundreds of companies make add-ons that will help (called Web Parts in 2010 and apps in 2013).

Just when you think you've got everything worked out, you discover you haven't. The incredibly powerful search facilities work best when every document has assigned metadata and a content type: for example, "this document is a policy or a user guide, not simply a Word document or a PowerPoint presentation, and was created in the HR department". This means revisiting all your documents, information architecture and search config options so users can say "show me all the policies HR have published in the past 93 days". They'll love being able to do that, by the way, but don't underestimate how long it takes to do properly. Or how horrible a death the inventor of XSLT-based config files deserves to die.

One decision we got absolutely right was to make all our servers virtual, within our VMware infrastructure. This goes against the advice of some experts, especially for the SQL server, but the advantages have far outweighed any potential negatives.

It's quick and easy to take a full snapshot of a VM before undertaking any maintenance work, and it's just as quick to revert if the work fails. This has saved our bacon on more than one occasion. Our current production farm comprises five servers (one web front-end, three application servers and one SQL server). There's a similar layout in our pre-production farm too, albeit with a lower spec. This is all in-house, rather than in anyone else's cloud. If a server is underperforming and could do with some extra RAM or CPU cores, a friendly chat with our VM team is all it takes.

SETTING OUT OUR AIMS

SETTING OUR AIMS
During the initial planning phase, which took many weeks, we identified three major aims for the SharePoint

project, based both on best practice and maintaining a service with a familiar structure for our users. First, a SharePoint site for each staff member where they could store “personal” university documents, namely those not relevant to other colleagues or students.

Second, an area we christened "My Department". It's similar to the personal site, but with just one for each department. This would allow staff in each department, school or faculty – around 40 in total – to collaborate on documents. All staff in the relevant department would have permission to access that site, but their colleagues in other departments would not.

Finally, a replacement for our ailing StaffCentral intranet, an area where departments could publish information

- ✓ This is the end result of a lot of hard work: our current intranet homepage design

The University of Brighton website features a prominent banner at the top for the 'Graduation Ceremonies' with a live video feed. The main navigation bar includes links for Staff, Students, Research, Learning & Teaching, and Events. A sidebar on the right provides quick access to various university services like Student Health, Finance, and Emergency Contact. The homepage is filled with news items, event details, and service sections such as 'Teaching & Learning', 'Research', and 'Student Support'.

and documents that were potentially relevant to all staff. For example, HR might publish pay scales and rules about annual leave. Every employee would have read access to all of StaffCentral, and staff in each department would also have write access to their area.

Designing the permission levels, deciding which subset of SharePoint's 41 permissions would be applied to each user, was essential but proved irritatingly time-consuming and confusing.

SharePoint has a fixed hierarchy when it comes to creating sites, so we also needed to decide how to map our desired structure into the SharePoint way of doing things.

At the top of the tree is the web application, which has a unique root URL. Within each web app you have site collections, and within each site collection is one or more sites (which are known as subsites).

We settled on three web apps, SharePoint creates each user's personal site as a site collection, and this underlying structure can't be changed. By design, each user is granted full admin permissions to their site collection and is allocated both a private document area and one shared with everyone else in the organisation. We needed neither of these things: this meant a couple of weeks of PowerShell scripting to ensure that new staff members were automatically allocated resources that fitted our requirements, not those of Microsoft.

Many SharePoint experts advise that personal sites are the least-used part of any SharePoint rollout and suggest that you consider them last. In our case, users were clamouring for the ability to access their work documents remotely – something our previous system didn't allow. This desire was a huge driver for SharePoint in general, and personal sites in particular.

In the MyDepartment web app, we gave each school, department or faculty

▼ Virtual servers made it much easier to change the specification if demand spikes

General	
Guest OS:	Microsoft Windows Server 2008 R2 (64-bit)
VM Version:	7
CPU:	4 vCPU
Memory:	32768 MB
Memory Overhead:	242.42 MB
VMware Tools:	Running (Current)
IP Addresses:	172.17.1.30
DNS Name:	ASTERION.university.brighton.ac.uk
EVC Mode:	Intel® "Westmere" Generation
State:	Powered On
Host:	
Active Tasks:	
vsphere HA Protection:	Protected

its own site collection, and adopted a similar layout in the Staff web app. Subsites allow further granularity, which helps allocate permissions. For example, the subsites for payroll, recruitment and pensions are in the HR department's site collection. Not everyone in the payroll team needs permission for the pensions subsite, making setting permissions easier at this level.

Once again, I developed PowerShell scripts to create new departmental site collections. Although this took a considerable amount of time and planning (the script that creates a MyDepartment site collection has to configure more than 40 different things), it was definitely the best method. This was partly for consistency, and partly because there are certain things that can't be done via the admin GUI and can

"I fully expect that we will be looking after ten million pieces of information within the next couple of years"

only be achieved with scripting.

Coming up with the finished software architecture of web apps, site collections and subsites sounds easy, but in reality, it took several weeks, lots of research and some serious schmoozing with SharePoint experts at conferences. As with everything in SharePoint, every decision has numerous repercussions and, if you don't know about these beforehand, they're likely to come back to bite you. Most of our planning meetings included at least two mentions of Donald Rumsfeld's famous phrase about the "things we don't know we don't know".

For example, SharePoint stores all its content – user documents, web pages, permissions data, search crawl indexes – in Microsoft SQL Server databases rather than flat files. A site collection can't span more than one database and, when we installed SharePoint 2010, it wasn't recommended to allow a database to grow to more than 200GB. Had we decided to implement the entire MyDepartment system as a single site collection, rather than a web app, all 40 departments would have had to share 200GB. Microsoft has subsequently revised the figures to upwards of 1TB per database, but managing such large files and backing them up is painful and something I intend to avoid.

While storing all content in SQL

```

Administrator: PS C:\work\build-mydepartment> .\Build-mydept.ps1
Set alternate csurl for root site
Creating rootsite2 explicit managed path
Creating rootsite2 team site collection owned by university\sa
Setting quota to 200 GB
Set alternate csurl
Setting theme to 'Summer'
Disabling the 'My Site Infrastructure' feature for site collection
Removing 'Unnecessary Permissions Levels'
Creating 'MyDepartment Admin' permission level in rootsite2 site collection
Creating 'MyDepartment Member' permission level in rootsite2 site collection
Setting 'MyDepartment Admin' member permission level in rootsite2 site collection
Security group is not specified
Setting 'MyDepartment Member' member permission level in rootsite2 site collection
Setting 'root' portal URL
Adding 'sites' collection library
Adding 'sites collection documents' library
Adding 'Customized Report' library
Adding 'Pages' library
Adding 'Style' library
Adding 'Structure' library
Adding 'Reusable Content' library
All Done
PS C:\work\build-mydepartment>

```

▲ Using PowerShell for site collections allowed much more flexibility and consistency

databases may seem a strange way of doing things at first, it does have its advantages. I can be confident that a database backup of any particular site collection contains all of the necessary files, metadata and so on.

It's possible to use a feature called Remote BLOB Storage (RBS) to move large document files out of the databases and replace them with pointers to a traditional file on a network share. However, the SharePoint community is awash with horror stories about what happens if the two storage systems ever get out of sync.

WHERE NEXT?

SharePoint has now been up and running for around three years and is proving to be a huge success. Migration from older systems continues, but we're taking the time to do it properly and to work with each department to establish the correct metadata types and underlying information architecture.

Right now, the new StaffCentral intranet receives around 85,000 hits a week and the collection of SQL content databases comprises around 2TB of data. The MyDepartment web app currently contains 850,000 files. StaffCentral holds 30,000 and MySites comprises 1.96 million files.

I fully expect that we will be looking after ten million pieces of information within the next couple of years.

The next stages of the project for my team include a refresh of the intranet's design. We're also actively researching whether or not we should upgrade to SharePoint 2013, which is released and established, or 2016, which has only just been released for testing.

Plus, we're exploring ways of using SharePoint's workflow features to modernise existing business processes currently being driven by paper-based forms and complex procedures.

One thing's for sure: we've come a long way since the days when I was lounging on my sofa, reading SharePoint Unleashed. ●



DAVEY WINDER

"SPOOKED BY THE LASTPASS BREACH AND WANT TO MANAGE PASSWORDS OFFLINE? HERE'S WHAT TO DO"

Many people are distrustful of online password managers – and it seems they may have a point. So how can you keep your passwords secure?

A research paper titled "No-one can hack my mind: comparing expert and non-expert security practices" (tinyurl.com/ozp4y6j) grabbed my attention recently. Written by three Google researchers – including Dr Iulian Ion, an expert in strong authentication – its abstract suggests that "average users" and "security experts" are miles apart in their thinking. Non-experts think in terms of antivirus software and regularly changing strong passwords, while experts primarily focus on prompt installation of security patches, two-factor authentication (2FA) and strong, unique passwords which are controlled by manager software.

There's so little overlap between these perspectives that average users may overlook 2FA, patching and password management completely. They're not getting it wrong, but could certainly do better by, for example, adopting a password manager. The authors encountered scepticism from non-experts, who preferred remembering their passwords via other methods that were perceived as less easy to hack, such as writing them down or simply keeping them in their head. Given the recent and lamentable security breach at password manager LastPass (tinyurl.com/pqtkkbe), you might be forgiven for thinking they have a point.

As someone who's regularly recommended LastPass for both personal and small-business use, I'm sticking to my guns. It's always serious when a prime target such as LastPass is breached. Email addresses and associated password reminders were stolen, leading to a rash of phishing attacks trying to snare master passwords. More worryingly still, the per-user salts and authentication hashes were also

accessed, potentially leaving users with weak master passwords vulnerable to brute-force cracks opening up their password vault. Notice I say "potentially". That's because LastPass strengthens those authentication hashes with a random salt and an additional 100,000 rounds of server-side PBKDF2-SHA256 hashing. They could still be cracked if the initial passwords were very weak, but it would take some time. Even so, LastPass forced most users to change their master password – 5,000 new rounds of hashing created a new key, which was then hashed again by "x" number of iterations ("x" being a parameter you configured for your account) to generate the key used to encrypt and decrypt your vault data. This key was hashed again before being sent to the server (which never sees the encryption key) to be salted and hashed 100,000 times more, yielding the stored authentication hash stolen by the hackers.

Furthermore, LastPass asked for email verification from users logging in from a new device or IP address, but users who were already implementing multi-factor authentication weren't asked to jump through these extra hoops. For example, when I use a YubiKey token, an attacker has to break my master password and get hold of the physical key in my possession. Free 2FA through the Google Authenticator app is also available, and

✓ One password to secure them all



would also stymie would-be attackers if – as LastPass has emphatically stated – the encrypted user vault data wasn't compromised. When you consider how open the company has been about this breach, I have no reason to disbelieve this.

If you're a LastPass user, you can also implement a geographical access lockdown using the advanced configuration settings. This enables country-specific access restrictions. There's another useful advanced tweak that lets you disable logins from Tor networks, a typical access route for would-be attackers.

However, this still doesn't mean all is rosy in the LastPass garden. A question remains over how the hackers breached network security in the first place and, despite LastPass' openness, some users have voiced concerns over the implementation of its response. I've heard that users who had changed phones or laptops needed to verify their new devices before being able to log in (basic security practice), but the verification was sent via email to an account – yep, you guessed it – secured by LastPass, so the users couldn't get the verification link! The only workaround was to use whatever system their email provider had in place to recover an account with a lost password. Judging from my mailbag, this gaffe has alienated a small group of people who are asking what they should do next.

GOING OFFLINE

My first instinct is still to recommend an online password manager. I've always been a big fan of 1Password, another online product that syncs across devices. But I'm encountering resistance to any recommendation for cloud password management, even if it's easy to use. So, if you've been spooked by the LastPass breach and want to take your password management offline, what should you do? As I'm addressing prosumers and small businesses on limited budgets, the options are fairly limited. You could consider the Qwertycard I looked at in issue 251, but if you want a "proper" offline password vault, I'd steer you in the



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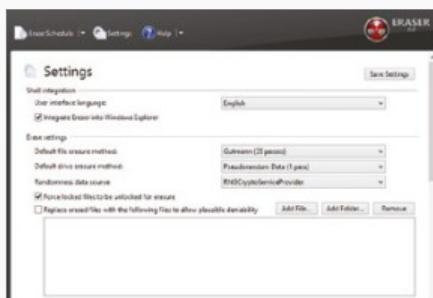
direction of the open-source KeePass.

KeePass supports multiple users, but all working via a single database stored on a shared network drive, with file-system access rights used to restrict write access. Unfortunately, you won't find any per-group access control lists, so all users will have the same master password and get read access to the same database. This is not a way I'd recommend using KeePass, but it's adequate for a one-man-band business, or for a user who doesn't need to sync across devices or set up multiple user rights. There are ways to do these things, but they tend to be complex and don't really do the job you want – or they involve third-party apps and the cloud you're trying to avoid. For a single user, assuming you're not too fussed about the in-browser automation of logins (again, third-party add-on required), you only need three things to take offline control of your passwords: KeePass, a USB stick and VeraCrypt.

Download the portable version of KeePass 2.x from tinyurl.com/2a4x48 and install it onto your USB stick. Plug the USB into any Windows computer and then run it – there's no need to install (the device you're plugging into will need a .NET framework). There'll be no new Registry keys, no config files in the Windows or application data directory of the logged-in user, as long as they have write access to their own application directory. Getting started requires nothing more than a download, unzipping and the File | New Dialog prompting for a composite master key. This is the master password that will be used to encrypt the database, so make sure it's long and memorable.

That's not as difficult as it sounds, and can be done using many different methods, such as using a passphrase complete with spaces between the words. You could always pay a fiver for a Qwertycard and use it solely to unlock your KeePass vault. The Qwertycard (qwertycards.com) fits in your wallet but remains cryptic to anyone but you. Its unique spacebar code is combined with a secret word or phrase – the only bit you need to remember – and is topped off with a site-name code transposed using the card. If someone got hold of both your Qwertycard and your KeePass USB stick, they still couldn't decrypt it without the secret phrase in your head. That's assuming they know that you've locked your KeePass database with it in the first place. Given this unlikely combination of factors, the risk of compromise is very low.

Now you just need to head to File | Database Settings | Security, and configure your vault's encryption – the default 256-bit AES/Rijndael is good enough. Combine this with a



▲ Don't forget to erase your CSV password file after migrating

serious number of key transformation rounds, which make cracking harder by transforming the composite key before it's used as the encryption key: something like 125 million provides a good balance between the added security and the delay in opening or saving your vault.

Now you can start to add entries. Take a look at the included samples to get an idea of the interface – everything's pretty self-explanatory. I suggest you use the key icon to the right of the password box to open up the password generator. Migrating from LastPass used to be problematic, but most of the import glitches have now been fixed. From LastPass, head to Tools | Advanced Tools | Export To | LastPass CSV File. This will create a text file you can save in CSV format. Then, in KeePass, select File | Import and scroll down to LastPass CSV. Choose your file, then, once the migration is complete, delete it using a tool such as Eraser (tinyurl.com/k3o6j) and let KeePass do the rest.

It's not perfect by any means, and you'll need to tweak some entries, but you can use it to make sure your passwords are suitably complex. You don't have to do them all at once (start with email accounts, as they're the most commonly compromised routes to other credentials) but create a routine of changing a few every day over the coming month and you'll soon have the task finished. Just remember, don't reuse passwords and stick to unique phrases for everything, keeping the strings random and lengthy. The built-in password generator enables you to do this with ease – although some services persist in limiting password strings to eight characters or disallowing non-alphanumerics – and make them at least 25 characters long. What you won't end up with is something that's automated like LastPass, so don't expect cross-device syncing or automatic login entries, unless you want to start entering the territory of add-ons and apps. These, frankly, dilute trust and increase the risks of using KeePass. I'm not saying that any of the add-ons and ports found on the KeePass site are unsafe, just that you have

to trust these third-party developers. Every time you allow an external application to access your database, you're increasing the risk of something going wrong.

That said, there's one more thing I'd add to the mix: VeraCrypt. It's the open-source encryption program that has taken off where TrueCrypt left off. But why would you need to encrypt your password database twice? Well, my thinking is that you should encrypt your USB stick using VeraCrypt. If you were unlucky enough to lose it, any chancer or even an experienced attacker would have to crack your stick's encryption before cracking your password vault's encryption. This double-whammy makes the chances of anyone getting at your passwords pretty remote, if you're using unique and complex passphrases in both instances. There's one more thing to do, and that's back up your KeePass data file to another encrypted USB stick for safekeeping.

As you keep this updated – and remember we're only talking about cutting and pasting one file – you'll always have a copy of your passwords if you lose the original. This would be a bad thing, but the double-encryption approach would soften the blow and give you plenty of time to access the backup and change your passwords.

DO I NEED TO ENCRYPT FACEBOOK?

Talking of encryption, Facebook has introduced support for OpenPGP. But it's not quite as good as it seems: for starters, its OpenPGP implementation of choice is GNU Privacy Guard (GPG). Earlier this year, Facebook injected \$100,000 into the pocket of GPG's creator to keep the project going after he revealed he was running out of cash to keep it alive. So far, so good – apart from the small fact that PGP isn't known for being user-friendly, and GPG isn't the friendliest of its unfriendly variants. It's far from straightforward, thus ruling out the vast majority of Facebook users from ever implementing it. Not that it's a huge disappointment, since all Facebook is offering to encrypt are the notification emails it sends you, assuming you're one of the few people not to have switched those off years ago.

Sure, it's useful if you need to request a new password, but not for the tedium of "Fred just posted to the Watching Paint Drying Appreciation Group". Facebook also uses HTTPS by default to provide SSL/TLS encryption, meaning that virtually all traffic to the immensely popular social network is over a secure connection – requiring no effort on the part of the user. ●



STEVE CASSIDY

“MICROSOFT’S FIVE PILLARS OF SUCCESSFUL NETWORK DESIGN ARE DROPPING FAR TOO MANY IT GUYS INTO HOT WATER”

Even Microsoft admits a hybrid approach is best – but to make it work, you need to understand the company’s unspoken rules

This month I’m going to talk about five things that Microsoft should have made clearer. This means getting technical – the sort of technical that, were I more like an archetypal consultant, I’d be wanting to keep to myself. But I’ve come to realise that Microsoft’s five pillars of successful network design are dropping far too many IT guys (and the networks they support) into hot water, to the detriment of their careers and the businesses they work for. Are things really that risky? I’d have to say they are.

There are clear use cases to be made for cloud computing, that marvellous phenomenon that causes all those happy blokes down the pub to hold forth about the wonders of Office 365, and all those super-happy IBMers to flaunt their massive (but hidden) compute farms. The clearest winners from cloud computing are those at the top, with tens of thousands of users, and those at the very bottom with fewer than five. At the medium scale, though, things get messy. There Be Dragons. There's no shortage of people who think that the cloud is a “journey” – one they're impatient to complete, because they're confident there's no downside. They have no evidence to back such confidence, nor any Plan B if it turns out they're wrong. But Microsoft figured out Plan B at least 18 months ago, when it switched from saying “cloud first” to saying that “hybrid” was very likely to be the right answer.

Hybrid has been around as a concept for a very long time, first mooted by Ray Ozzie and Paul Maritz in their roles as the Gandalf and Saruman of the cloud agenda. But it's always been by far the

hardest of the three original options to implement. In practical terms, to make hybrid computing work, you need to make your entire network fully compliant with the right way of doing things. Not right according to your own research; not right according to ten million lost and helpless mutual-support forum threads; right according to the way Microsoft thinks it should be done, yet hasn't made clear at all, at any point.

Why does this need to be done? Because we've all moved on from the simple environment that cloud computing appeared to need. Reliance on general computing, not just in the cloud, has risen dramatically over the past few decades: you can't run your business on next door's unsecured Wi-Fi and a Hotmail account nowadays. You have to factor in failure at your connection provider and host when planning ahead, and that demands more local computing smarts than was the case even two years ago. Notice that I said “smarts”, because mere speed hardly matters any more, and storage is practically free by the standards of the last decade. What matters now is age

✓ Even Microsoft seems to have admitted that hybrid is the right answer

and resilience: your network needs to be smart enough to keep your people working on the worst of bad days.

THE 5 GREAT UNCLARITIES

So, what are the five most widespread LAN mistakes that occur because of a lack of clarity in Microsoft's advice?

WHO OWNS DHCP?

It's perhaps the easiest of protocols to set up, and therefore often the least attended to in the long-term life of a network. All DHCP does, according to the web, is pick an unused network address and issue it to a device that wants one. Sounds harmless enough, and many tiny networks do what the instruction leaflet says and set up their router to provide these addresses. But this is where the problems start, because the provision of addresses has become much more interesting since the rise of Wi-Fi and the advent of ever-larger networks.

DHCP is now a way for Wi-Fi access to be controlled by a dedicated device that hands out addresses to wireless clients. In bigger networks, DHCP can become like a crack-dealer, an insurgent, an evil penetrator of carefully built security



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▲ Businesses that operate on mobile devices often end up with performance I would have been disappointed with in the 1990s

solutions, just because some chump turns up with one of those USB Wi-Fi micro-stations so that his smartphone can connect to the corporation's link.

If you're running Microsoft PCs talking to a Microsoft server, then that server wants to use the DHCP database to validate that the PCs listed there are all friends. The delays caused by the server and PCs forever gabbling to each other to verify security requirements may seem like overkill, especially when there's no doubt about identity, but this process is neither optional nor up for discussion. Sidestepping the Windows DHCP server provokes all manner of irritating and apparently unrelated problems such as fluctuating populations on browse lists, slow copying of files, inexplicable requests to re-enter damn-fool passwords and failure of single sign-on. I've yet to find a single network – even one where VoIP phones get their addresses from the Windows server – where there was an actual technical barrier to letting Windows do its thing, as distinct from a personal preference or some weird global-politics-based piece of dogma.

2 DNS OUTSIDE THE LAN

This is very common now in businesses that operate with only tablets and smartphones. They have almost no files stored locally, and if they do they're on a NAS device that probably spends most of its time streaming music. For this kind of business, there's no need to have any local resources at all, because they want everything to be globally accessible and believe that any resources inside

their place of business will be cut off from the rest of the net by the security needs of their firewall or ISP. This outlook has consequences, naturally, and I find that most of these guys live with performance that would have had me climbing the wall and asking for a refund even back in 1997. They also spend around four times as much on web design than they ever would have done on buying a small server and a few CALs, which is pretty poor payback for the amount of management, explanation, quality assurance and even litigation that this necessarily entails.

I know that's a lot to infer simply from not having a DNS inside your business, but it's still a handy benchmark for a certain level of technical commitment, and a strong sign that the proprietors want to keep control of both their company information and their contractual relationships. A properly set-up copy of Windows Server 2012 Essentials will run a DNS for you, and let you add nice names for things, using perfectly well-understood standards. You'll even be able to carry on working when your hosting company has a hissy fit or your web guy is found locked in a dungeon in Zurich run by the Hell's Angels (allegedly).

The most common confusion I encounter these days on the subject of DNS is whether yours needs to be configured with your one and only brand name, and whether it should also be responsible for answering any lookups made by any curious person anywhere on the planet. Lots of less reputable web guys will say such configurations are the kiss of death for internal DNS, which strikes me as pretty rampant sales nonsense: if you're pcandtechauthority.com.au, then there's no reason at all

"It's nuts to stick with only one of anything – be that a server, a NAS, an internet connection or a cloud service"

why your internal LAN DNS name can't be pcandtechauthority.com.au, and no outside requesters will ever know any different.

With a DNS added to an otherwise 100% Windows network, lots of security nonsense stops being a problem; the sole exception is the state of any NAS boxes you may have in your network. To say that the NAS marketplace isn't hot on standards is a gargantuan understatement, an elephant in a telephone box: each NAS may or may not want to own the entire network address space, may or may not want to hook you into its own poorly described cloud backup service, and may or may not want to maintain your username and password lists (despite dialogs and web management pages that claim otherwise). To my mind this doesn't entirely disqualify them as usable business tools. However, it does change their status from the core of your in-house storage solution to an optional extra that helps back up other things, and divides fast and small files from slow and big ones. I've yet to see a NAS offer any kind of DNS service that does more than parrot what your external supplier's DNS gives you anyway. Whenever I see a network with just a NAS and hear how much money it's saved them, I tend to bite my cheek and wait for the phone call.

3 SAMBA MADNESS

Nothing to do with dancing, unless you count dancing around the truth. The plain fact of the matter is that SMB – often called "Samba" when you're reading about non-Windows servers and file systems – is Microsoft's own in-house protocol for servers and workstations to talk to each other and move files around. The company has never said that SMB can or should be open-sourced, nor entered into any arrangements with NAS vendors to guarantee long-term compatibility. There have been updates – SMB3 in Server 2012 R2 brought a significant performance boost, to take but one example – and there are even offshoots such as CIFS. However, if you come across a NAS vendor that requires you to download Registry patches for the (Windows) PCs that use their NAS, then you're asking for trouble. Generally speaking, I've found that such a hack-



and-patch approach delivers you a very particular kind of pain on the next big Patch Tuesday, when Microsoft decides to reverse the configuration your NAS vendor has supplied. Weirdly, given that SMB is Microsoft's baby to do with as it sees fit, blame for these bad days never seems to land at the right door (that is, the NAS vendor). Again, whenever I hear a business loudly proclaiming that their \$2,000 storage box can't possibly be in the wrong, and that the fix certainly could never be a \$600 PC with a \$600 server licence and \$600 of enterprise-grade SATA drives in it, I wish them luck and leave them my business card.

4 NOT ENOUGH SERVERS

"We had a lot of trouble with the server" they say, "so we moved to the cloud." Single-digit counting is a common reaction to excessively techie sales pitches (and, to be fair, also to the early adopters of largely experimental, cluster-based, multi-server environments), but I've yet to meet a techie who feels this is a terrible slight upon their character. That's mainly because having only one of anything is a licence for techies to print money – cue all those war stories about rolling back to the old config in the wee small hours of the morning, or restoring SBS servers from scratch and then spending weeks unravelling the consequences of recreating all the user logins and security groups.

It's nuts to stick with only one of anything – be that a server, a NAS, an internet connection or a cloud service. With physical servers, you're utterly dependent on it all running well, all the time; with cloud services you're dependent on several distinct factors, such as the financial health of your cloud provider, the physical wellbeing of their hosting centre, the tested nature of their recovery procedures, and even how important you are to them as a customer.

I encounter this "count of one" problem so often that I've concluded there's a kind of business owner who actually needs something to worry about, and thinks that might as well be IT. Increasing your counts, by going from even the smallest server up to a pair, or mixing a server and a NAS, or having some of your gateway servers hosted on Azure for instance, is the easiest way I know to keep your egg-to-basket ratio at a sensible level. I realise this can add licensing costs, but my point remains the same. Microsoft has never made this a huge secret: it may have made it a trifle incomprehensible, but never actually secret. And there's never been a time when Microsoft's terms, activation and pricing have been so good for the customer as they are now.



5 24/7 AND SHADOW COPY THINKING

This particular sin is one for rather larger businesses. It's the one that got me thinking about this whole topic, after reading Mr Mitchell's excellent in-depth critique of the feature set of the Netgear NAS he was battling with a couple of issues ago. His problem was that when operating as an iSCSI volume, this Netgear disagreed with the provision of shadow copy services on the volumes it was presenting.

"Sidestepping the Windows DHCP server provokes all manner of irritating and apparently unrelated problems"

Shadow copy is one of those services that drew a great deal of techie attention when it first hit the street; it seemed to get around many of the limitations of working with servers that have to be continuously available. This was like catnip for both system designers and salespeople: everyone's experienced the anxiety of downtime, and everyone likes to think their people can't exist without some systems to talk to. So we have add-ons and entire structures devoted to ensuring that nothing ever stops, not even for a backup.

This is all well and good in those sectors and at those scales where it was first invented, but once this notion of 24/7 availability escapes into the wild, that's when trouble starts. A full-scale user of a differential backup product that makes use of shadow copy systems is definitely not operating at a scale where they daren't touch their lone and creaking server. Which is just as well, because an in-depth reading on the subject of playing

with shadow copies will quickly reveal that Microsoft never intended them to be a long-term sole store for all your data. Many resources end with the advice to delete and recreate the misbehaving volume, or even to erase and reload the misbehaving server – neither of which are happy outcomes if you've bet your entire business on that single point of failure and thought that incremental shadow copies would offer the right way out of any trouble.

This could be a corollary to rule 4 about not having enough servers. Really, though, it's yet another odd example of me ending up criticising a feature even though it's actually been bent a long way out of shape in order to perform the role it's used for out in the wild. Ancient IT wisdom comes into play here, too, about not mixing your test and production environments, and about how long it takes you to move all your data from place to place. But my advice about buying into totally continuous availability remains the same – it's a big boy's toy that only really starts to work when all the other toys are present in copious and high-performing numbers.

This brings me neatly back to the most recent shift in overall advice from Microsoft – the thing about how hybrid computing is the way of the future. This is leap-forward advice: you can see how many of the shortcomings that I'm finding out there – be they cloud or old-school local computing – all converge on the same answer. It's much easier to run an under-populated local network when you have some Azure VMs in the mix, and it's much easier to switch cloud suppliers if you have some local resources and local copies of your data and website as bargaining chips. All of these scenarios fall under the hybrid computing description, and I expect that's what Microsoft has been driving at for the past few years.●



WHY INBOX ZERO IS A FORM OF HYPNOTISM

Ry Crozier and the psychology of Outlook

Next time you think about getting your inbox back to zero, stop and think – what will it achieve? And why do you even want to do that in the first place?

Welcome to the world of software design psychology, where the goal is to create applications that are so compelling you'll be completely convinced it's your life goal to go on and master them.

In theory, the best applications are so convincing that using them induces a trance-like state not entirely dissimilar to classical hypnotism, psychologist Dr Aleks Krotoski told the recent Wired for Wonder event in Sydney. "When you're in a trance you're neuro-biologically convinced about things that define rationality," she said.

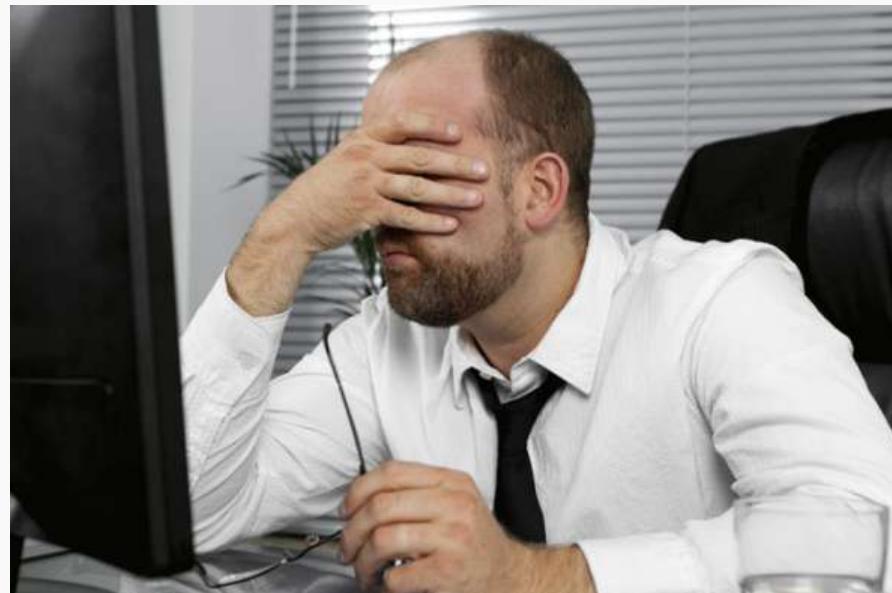
While it might appear that emptying your inbox is a rational path of action, it's what the designers of Outlook and Gmail want you to think. Sure, you might feel a sense of achievement when you delete that last piece of email, but have you actually achieved anything other than being distracted for hours from the stuff you really should be doing?

"The people who are designing these things want us to be compelled," Krotoski said. "We are convinced by

the technology that emptying the inbox is what we want to do. We're convinced that the best way to interact with our friends and our families is by posting status updates and pictures on Facebook or with work colleagues by connecting on LinkedIn.

"But when you return to your desks think carefully about every activity you find yourself performing as part of your work activities. Are you doing it because it's useful and productive and it's the right thing to do for the business, or because you're fascinated by the mesmerising eyes of the designers?"

The trance that systems like email induce is a kind of "flow state", according to Krotoski. The concept of flow is the work of psychologist Mihaly Csikszentmihalyi and can be likened to a feeling of being 'in the zone'. "Everybody has been in flow," Krotoski said. "You've gone for a run and you've pushed through those first two painful miles, you've discovered hours have passed when you're sitting there simply stringing beads or playing a piano. 'In flow, you are so fixated on what you're doing that everything else evaporates.'



"to get you into a flow state, into a trance, where you feel motivated to continue"

The concept can be applied broadly across software development. Game developers, for example, want gamers to get into the flow of the game so they become motivated to finish it. The creators of e-commerce sites want shoppers to have a similar experience. Krotoski cites a 1999 Vanderbilt University study that drew links between successful websites and the flow states they tried to create for users. "We are so deeply in a trance that we will follow the website's lead into a rabbit hole for hours, which I'm sure many of you have found yourself doing," she said. "We become lost to the rest of the world."

Krotoski sees email as not dissimilar: its creators want "to get you into a flow state, into a trance, where you feel motivated to continue because your skill is matched by that challenge". "Because remember: most people's jobs isn't to do email. In fact, the email flow state interrupts every other flow state," she said. "Ping! I'll just answer that. Oh, five hours later I haven't done that thing I needed to do."

What it all boils down to is this: while you may be surrounded by systems that try to draw you into their flow patterns, your challenge is to resist and refocus on what it is you actually need to achieve. Or, it's simply a good excuse to forget inbox zero ever existed.

For more content like this, do please visit the ACS Information Age website at <https://ia.acs.org.au>

A MINTY FRESH INSTALL OF LINUX MAKES WINDOWS 10 SEEM TIRED AND STALE, SAYS JON HONEYBALL

PC & TECH AUTHORITY A few months ago, it was the 30th anniversary of Frankie Goes to Hollywood's seminal album Welcome to the Pleasuredome. There was a special remastered box set produced through crowdfunding, and some of us went to Sarm Studios for an evening playback of the album and a Q&A session with producer Trevor Horn and his team. It was a great event, one to be treasured.

Why, aside from bragging rights, am I mentioning this? It's because the track "Two Tribes" has a sound sample of someone pretending to be Ronald Reagan saying "war breaks out and nobody turns up" – which is exactly how I feel about Windows 10. Alright, it's here. It's a huge step forward from the unmitigated disaster that was Windows 8. I get a good feeling of Schadenfreude reading back reviews and postings from the Microsoft fanboys and girls who said 8 was "truly great". No it wasn't, and I wasn't afraid to say so.

Of course, I can discuss all the good new things in its successor but, at the end of the day, does anyone care? Almost more importantly, should anyone bother? "Microsoft launches Windows 10 and nobody notices" would be a fitting remake of "Two Tribes".

I installed a recent build of Linux Mint 17.2 with the Cinnamon desktop today. And guess what, it's really quite nice. It still has flashes of geekery in places, but that's almost charming in 2015. Hooking it up to my old HP Color LaserJet 5500 on the network was a piece of cake: it found the driver, installed everything I needed and just worked. Installing Chrome was equally stress-free. It comes with

a whole bunch of useful software, including the full LibreOffice suite, which does a very good job of pretending to be an older version of Microsoft Office – the one before the hairdressers got involved and restyled it. In fact, maybe I should call the most recent Office "The Bouffant Edition"?

It also has a decent mail client, and good support for almost everything really. It boots quickly and installation is a breeze, taking only a few minutes to get itself up and running.

"So far, nothing has scared me or caused me to wince, which is a big improvement on the Linux builds of old"

Again, I am left with the thought that this is really rather good, quite productive and a little bit hair shirt, in a charming sort of way for an old tech crony like myself. So far, nothing has scared me or caused me to wince, which is a big improvement on the various Linux builds of old.

Then I look at all of the data-slurping going on in Windows 10, and think to myself "is this really where I want to go?" and "is this really what I want"? I have to be honest with myself and wonder if it really is the best option.

At the end of the day, Microsoft has come up with a better 64-bit Windows 7 in Windows 10. I can take or leave the ability to run Metro apps (or whatever they're called this week) in a window, and don't find the new Start menu to be that overwhelming either. That

said, the underpinnings are definitely better, with more solid support for the latest hardware. All of these things are undoubtedly good, but I still can't shake of a big feeling of "meh" with all of this. I should be thrilled that Windows 10 is free, but I know that Microsoft would have no hope of getting people to upgrade if it cost them money. That time has passed. Nowadays, far more people use Android for real day-to-day work, and those who have bigger budgets use iOS. For laptops, I'll take Apple over anyone else thanks to the hardware, and OS X is more than good enough for what I need to do when I have to sit in front of a real computer.

So, despite the huge engineering effort to get Windows 10 ready to ship, I'm still unenthused. Windows 10 Mobile isn't even close to shipping and, when it does, it will impact just 2.5% of the marketplace – very modest indeed. I also just can't get myself enthused about Windows 10 on an Xbox, sorry.

Then a perky little chappy called Linux Mint strolls along, which is both much better than I thought it would be and really quite fun. It doesn't try to trick me every which way about my data, privacy and so on. There isn't an end-user agreement that runs to pages, with all its associated worries. It's good enough to let me get on and do my work, my way, and for me – without the feeling that someone, somewhere, is viewing me merely as a profit centre.

I guess I'm just getting old. Of course, I will install Windows 10 onto all my Windows 8 machines as quickly as possible, to rid myself of the lingering nasty smell. Windows 10 is good enough, but I fear even that's not enough anymore.



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